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ABSTRACT

This monograph contains eight papers examining vocational teacher education theory and practice within the context of new teacher education reforms and practices. Various theoretical and practical aspects of preparing vocational teachers for tomorrow's workplace are discussed, including the following: challenges/opportunities affecting the field; contemporary approaches to reform; the links between vocational education and the workplace, family, and community; and changing teacher roles in view of such educational innovations as tech prep, curriculum integration, apprenticeship, career academies, and magnet schools. The papers are: "Foreword" (Birdie Holder, John S. Washburn); "The Past, Present, and Future of Vocational and Technical Teacher Education" (Richard L. Lynch); "Building a Context for Reform" (Nancy Hartley, Corinne Mantle-Bromley, R. Brian Cobb); "Philosophy: The Conceptual Framework for Designing a System of Teacher Education" (Melvin D. Miller); "Principles of Vocational and Technical Teacher Education" (Richard L. Lynch); "General Education and Subject Matter Education Components of the Vocational Teacher Education Program" (George H. Copa, Jane Plihal); "Contemporary Approaches to Teaching and Learning" (Bobbie T. Biggs, Barbara E. Hinton, Sarah L.S. Duncan); "An Alternative Vision for Assessment in Vocational Teacher Education" (Scott D. Johnson, Tim L. Wentling); and "Epilogue" (Keith Bromley, R. Brian Cobb, Nancy Hartley). (MN)

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Beyond TRADITION:

Preparing the Teachers of Tomorrow's Workforce

Edited by Nancy K. Hartley and Tim L. Wentling

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BEYOND TRADITION:

Preparing the Teachers of Tomorrow's Workforce

BEYOND TRADITION:

PREPARING THE TEACHERS OF TOMORROW'S WORKFORCE

EDITED BY

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UCVE
University Council for Vocational Education

1996

Columbia, Missouri USA

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University Council for Vocational Education

The University Council for Vocational Education is a nonprofit organization representing the nation's leading universities. The Council provides leadership for teaching, research, and service initiatives in vocational and technical education.

The mission of UCVE is to be a recognized force in shaping the future of vocational education through improving the policy and practices of education in the United States toward the betterment of individuals and the larger society.

The purpose of UCVE is to:

1. provide a forum for surfacing and debating the contemporary issues significant to vocational education,
2. develop positions on emerging trends and issues that have implications for improving the policies and practices of vocational education in the near future,
3. improve the capacity of institutions of higher education to shape the direction of vocational education through teaching, research, and service, and
4. promote an awareness and understanding of the significant issues in vocational education and the University Council's position regarding these issues as well as the capacity of higher education.

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Foreword

Rapid changes in technology, shifts in the organization of the modern day workplace, and the demands of a global marketplace have fostered growing discussions about the preparation of youth and adults for work. At the heart of these discussions is the recognition that investment in the preparation of secondary and postsecondary vocational education teachers is of prime importance.

The University Council for Vocational Education has supported development of the third in a series of monographs designed to provide leadership and direction for serious discussions on issues affecting the preparation of vocational teachers. The Council includes representatives of 21 institutions of higher education who provide a forum in which universities can participate in studying to improve the policies and practices of vocational education.

This monograph was prepared to describe state-of-the-art policy and practice with respect to the preparation of vocational teachers, to clarify existing practices in vocational education in the context of new teacher education reform and practice, and to provide a mechanism for facilitating dialogue among professionals regarding vocational teacher education as an integral part of the broader teacher education reform movement.

To be sure, there are many unresolved issues affecting vocational teacher education reform. Inherent in the development of this monograph are the unique perspectives of noted authors on the array of literature and issues associated with vocational teacher education reform. The eight chapters of the monograph cover the following content:

- Richard Lynch begins with a discussion of the theoretical overview of vocational teacher education, reflecting on the challenges and opportunities affecting the field.

- Nancy Hartley, Corinne Mantle-Bromley, and Brian Cobb examine the philosophy and history of the teacher education reform movement with a particular emphasis on contemporary approaches to teacher education reform.

- Melvin Miller speaks to the need for a coherent philosophy to ensure that vocational teacher education practices and theories are congruent.

- Richard Lynch continues the dialogue, examining the various principles on which vocational and technical teacher education are founded and follows closely on the pragmatic philosophy espoused by Miller.

- George Copa and Jane Plihal examine the general education and subject matter bases associated with the workplace, family, and community.

- Bobby Biggs, Barbara Hinton, and Sarah Duncan examine contemporary approaches to teaching and learning: tech prep, curriculum integration, apprenticeship, career academies and magnet schools, changing teachers roles, and the impact of cognitive psychology.

- Scott Johnson and Tim Wentling examine standards and assessment processes as they apply to vocational teacher education. A reasonable case is built for utilizing assessment for purposes of accountability, student achievement, and program improvement.

- Keith Bromley, Brian Cobb, and Nancy Hartley reinforce the consensus among the authors of this monograph that substantive change is needed in vocational teacher education. They acknowledge the complexity of this challenge, but they conclude that without this commitment, meaningful educational reform cannot be achieved.

Appreciation is extended to the many professional colleagues involved in this project. These include a wide array of manuscript reviewers. Sarah Duncan's contributions include technical editing and preparation of the final manuscripts for publication.

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The Past, Present, and Future of Vocational and Technical Teacher Education

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Data and empirical evidence suggest that our nation's colleges and universities are not responding in meaningful ways to the nation's call for reform in teacher education related to reform in vocational and technical education–workforce education. This chapter concludes that vocational and technical teacher education must change substantially and that administrators and faculty at colleges and universities must assume major leadership and responsibility for these changes. Underpinning a teacher education reform agenda are five major contexts or themes: professionalism, epistemology, delineating a knowledge base, lifelong learning, and accountability. A contemporary knowledge base is postulated as grounded in four broad areas: workforce education (common core subject matter, specialized subject matter, and workforce preparation processes); general education and the liberal arts; knowledge of the learner, pedagogy, instructional technology, and professional education; and clinical practices.

THEMES OF REFORM IN VOCATIONAL AND TECHNICAL EDUCATION

> Improve education to bridge youth and adulthood... Develop a high quality American education and training system... Build high performance workplaces and schools... Remember the forgotten half. . . Integrate academic and vocational education... Teach all aspects of the industry... Allow for meaningful participation of all youth until mastery... Serve diverse populations better... Provide early school orientation to work and family life. . . Provide career counseling and

guidance to *all* students. . . Collaborate with employers, employees, community, and social services. . . Integrate cognitive, industry-related, and broad technical skills. . . Teach in ways to insure that *all* students will learn. . . Create links between high schools, the workplace, and postsecondary institutions. . . Connect industry and education standards. . . Provide for seamless delivery systems. . . Prepare world-class learning enterprise workers. . . Teach for the information age. . . Reward good teachers.

Tech prep . . . School-to-work . . . Apprenticeships . . . Authentic assessment . . . Authentic experience . . . Learner centered . . . Certificates of mastery . . . Core academics . . . Career counseling . . . Broad career clusters . . . Career majors . . . All aspects of the industry . . . World class standards . . . Competency-based . . . Customer-oriented programs . . . Portable certification . . . New technologies. . . Collaboration . . . New and improved teacher education . . . Access, equality, and excellence.

The above are central themes in the scores of reports prepared during the past decade to encourage reform in our nation's schools, especially in its vocational and technical education high school programs. The themes are heavily grounded in the desire to educate *all* children, prepare an adequate workforce for the future, bring context and relevancy to the education of our young people, link high school education with postsecondary education and workplaces, and implement a system of standards and measures. Most reports seek a mandate that high school curricula become much tougher for students. Some also mandate that the general diploma be eliminated and students follow the perceived rigor of a college-bound track and/or a new and improved vocational-technical track.

It is perhaps important to note that many of the reports where these themes have been cited speak to education reform holistically: all students, all systems (at least public school systems), all communities, comprehensive curriculum. Other reports speak, more or less, to vocational and technical education and focus reform primarily on student populations who will probably not matriculate into a baccalaureate-level college program but who, in all likelihood, will pursue postsecondary education at less than the baccalaureate

level and/or enter the workforce upon high school graduation. Regardless of whether the focus in the reports is on general program and curriculum reform or specialized programs in vocational and technical education, it is clear that a new national philosophy and direction for workforce education is emerging.

Education reform reports almost universally acknowledge that it is teachers–better educated, prepared differently, cast into different work configurations in school and *real world* workplace environments, and ready to integrate business, community, and school experiences for the benefit of learners–who will essentially revolutionize classrooms and who will be the key players in education reform. These reform reports *imply* that both initial (preservice) and supplemental preparation (inservice, graduate, and staff development) of teachers will change or at least be improved. However, reports don't talk much about this–at least not very specifically–and dollars have not gone to colleges and universities to help them reform their vocational and technical teacher education programs. Funds have been allocated for staff development, but usually it is local school systems or consortia of schools that have been funded and left up to their own devices to figure out how to train the teachers.

The fundamental question seems to be: Does vocational and technical teacher education need to change in our nation's colleges and universities? If the answer is yes, then there are many corollary questions. How and to what degree? Who or what is to provide the impetus or the incentives to change? And, what are we talking about here–just university preparation, or inservice and staff development sponsored by state departments of education and/or local school systems as well? Postsecondary? Secondary? State certification requirements? All subjects traditionally identified with or at least funded by vocational education? Special workshops or programs for nontraditional or alternatively-certified vocational teachers?

Does vocational and technical teacher education need to be drastically overhauled? Or does it need just a bit of tinkering or minor correction to satisfy its critics and to prepare better its products? Is it changes in structure or substance or both? What is the epistemology? And what about the many vocational and technical teachers who receive no teacher education at all, but rather are employed in postsecondary or secondary schools as teachers because of their extensive occupational experience in a trade or profession?

Answers to the fundamental question and related corollaries are not easy. The topics themselves are controversial, emotional, and threatening to many vocational and technical teachers and teacher educators who have spent years of their lives teaching their trade or profession. Nevertheless, the debate must begin.

To the fundamental question (Does vocational and technical teacher education need to change in our nation's colleges and universities?), the answer postulated here is a definite *yes*. Furthermore, the changes must be substantial; administrators and faculty at colleges and universities must assume leadership and responsibility for appropriate changes. These conclusions come after much review of the education reform literature and are based on data and reports focused on teacher education in general and vocational and technical teacher education in particular.

This chapter is intended to provide some context and perspective for these conclusions by briefly tracing the history and philosophy of vocational teacher education and then describing some of that which is known about the major design and delivery systems used in this country to prepare educators to teach in vocational and technical education programs. These sections were written to provide some understanding of the patchwork of vocational and technical teacher education currently in existence in this country today. Drawing on much of the extant reform literature, the chapter then posits a framework for the future grounded in teacher education reform themes and a framework for a proposed knowledge base for vocational and technical teacher education.

HISTORY AND PHILOSOPHY OF VOCATIONAL AND TECHNICAL TEACHER EDUCATION

There is a long history of autonomy in vocational and technical education relative to the employment of teachers to instruct others in their craft or trade. Vocational teachers, for the most part (and certainly those who teach in trade, industrial, manufacturing, and health occupations programs) did not (and do not today) have to follow the same teacher preparation or state certification rules as did (do) other public school teachers. Throughout the 75-year history of federally-supported vocational education, occupational teachers were employed primarily because they had years of extensive experience

in a craft or profession (i.e., auto mechanic, cosmetologist, medical technician, carpenter, nurse, electrician, mason). These vocational teachers were not required to meet the same standards as other public school teachers. When college degrees were deemed as a minimal requirement for teachers in most states and in most subjects, vocational education was granted an exception. In effect, vocational and technical education has always had a nontraditional or alternative approach to preparing and certifying its teaching force.

The autonomy for certifying vocational and technical teachers and the philosophy and beliefs that undergird the importance of occupational experience as prerequisite to teaching a vocational subject are deeply rooted and firmly held by many vocational and technical educators. In one of the earliest writings on this subject, the National Society for the Promotion of Industrial Education, in 1914, stated that vocational teachers should be employed based upon interviews and practical demonstrations of their trade and that the process should be "separate and apart from the certification of regular teachers." Similarly, the Federal Board of Vocational Education, in 1917, perceived that state teacher certification requirements were too high and were sacrificing technical proficiency for professional training. The Board believed that vocational education teachers couldn't meet the professional training (i.e., college) requirements, such training was often impractical, and colleges and universities were not capable of preparing trade teachers. Therefore, alternative schemes were established in each state for preparing vocational teachers.

There are certainly historical and philosophical differences on the topic of teacher education among the program areas traditionally identified with vocational education. The original Federal Board of Vocational Education in 1917 did believe that institutions of higher education were capable of preparing agricultural and home economics teachers, provided the "boys" and "girls" had graduated from high schools where farming and homemaking were taught and so long as the boys worked on their parents' farms and the girls were tutored in homemaking projects by their mothers. The Board believed that agriculture and home economics teachers needed to have practical experience, but it didn't necessarily have to be employment in a factory or business. The experiences were used by colleges of agriculture and colleges of home economics as a cornerstone from

which to build baccalaureate degrees—with strong grounding in the sciences and at least a minimal preparation in other areas of general education. Thus, these two programs advanced over the years with nurturing from colleges of agriculture and colleges of home economics.

This practice of using employment in a trade, practical experience, or extensive projects as primary preparation modes for teaching is an outgrowth of the essentialistic philosophy of Charles Prosser (Prosser & Quiqley, 1949), the first administrative director of the Federal Board of Vocational Education. One of Prosser's central theorems was that vocational education will be effective only in proportion to instructors' experience in applying skills and knowledge to the operations and processes they teach. In effect, Prosser believed that teachers' trade experience would correlate with student outcomes: the more, the better. The aim of instructor training, therefore, was to provide professional knowledge and experience to those who were already masters of an occupation. This instruction was to be carefully monitored (i.e., by state supervisors) so that only material directly related to teaching the occupation was used, that it have immediate applicability, and that it be taught in concrete rather than abstract terms.

Conversely, John Dewey, as a progressive or pragmatic philosopher, promoted a more general education to prepare teachers to help students prepare for a lifetime of learning and change. He believed in holistic development of the child and that the child's universe–"social activities"–become the center of the child's education. Thus, to prepare teachers well, colleges and universities should provide a broad general education, but with context and understandings related to students' activities. If alive and speaking on the subject today, Dewey would no doubt advise that it is the general and professional education of the teacher that would correlate with student outcomes: the more, the better.

This philosophical dichotomy and its inherent practices continue today in vocational and technical teacher education. Some of the traditional programs–trade and industrial education and health occupations, for example–rely heavily on occupational experience as the primary vehicle for initial entry as a vocational teacher. Alternative state certification schemes are still in effect today to allow those with a high school diploma or its equivalency and extensive occupational experience (e.g., ranging from 2 to 9 years,

with an average of 4 years) to teach their craft or trade in public schools, especially in public vocational schools. Some states require occupational licensing as a means for certifying teachers, thus the National Occupational Competency Testing Institute has a system of over 50 occupational competency tests, employees, and an inherent bureaucracy that aid in providing information to certify vocational and technical teachers. College-level preparation is largely irrelevant, but the states do usually require some professional training ranging from 1 to 576 hours, with an average of 120 clock hours.

Conversely, other traditional vocational programs, most notably home economics and agriculture, rely heavily on college-level teacher preparation, but usually include some practical or project-oriented experiences. They historically aligned administratively with their subject-matter colleges (i.e., a college of agriculture or a college of home economics) and include strong subject-matter curricula. Other more recent programs identified with vocational education–such as business education, marketing education, and technology education–seem to include both employment or practical experience (often in laboratory environments) and align about equally with a subject-oriented college (e.g., business or technology) or a college of education.

Thus, through its 75-year history, vocational and technical teacher education has been nurtured through varying philosophies, established in different administrative structures often relatively isolated from other professional teacher preparation programs, and aided in development and growth with federal funds that often mandated specific forms and subjects for preparation. Colleges and universities were often, but not always, part of the teacher preparation delivery system.

Programs in higher education grew up largely around subject-specific areas. In the 1988-89 academic year, 428 colleges and universities purported to offer at least one vocational or technical teacher education program: 90 in agricultural education, 236 in business education, 32 in health occupations education, 268 in home economics education, 89 in marketing education (distributive education), 98 in vocational special needs education, 176 in technology education (industrial arts), and 122 in trade and industrial education. The programs were in public and private (often church affiliated) institutions and administered in a variety of academic colleges (e.g., business, education, home economics, agriculture, technology, applied

arts and sciences) and departmental structures (e.g., as their own department, a concentration or emphasis in a subject-related department, or a major within a comprehensive vocational education department).

THE SCENE TODAY

Vocational and technical teacher education today is delivered through at least three major design and delivery models with many variations within each: (a) alternative certification programs, primarily using occupational experience as a substitute for formal education; (b) inservice education or staff development programs sponsored variously by state departments of education, colleges and universities, local school systems, professional associations, policy-influencing groups with a specific reform agenda, education consultants or vendors; and (c) college or university degree programs. In reality, there is probably also a fourth approach: a do-it-yourself model, in which many vocational and technical education teachers–especially in postsecondary technical schools or community colleges–receive no teacher preparation, at least prior to beginning to teach.

Alternative Certification Programs

Virtually every state permits an alternative certification or credentialing program for some teachers in vocational and technical education. The primary alternative is to substitute years of occupational experience for higher levels of formal education. All states require at least a baccalaureate degree to certify or credential secondary and postsecondary academic teachers; however, the recent *National Assessment of Vocational Education* (NAVE) (1994) reports that nearly 12% of the nation's secondary and 15% of the postsecondary vocational teaching forces have less than baccalaureate degrees. This is especially true for trade and industrial education (T&I), where more than 45% of the secondary T&I teachers and 33% of the postsecondary trade teachers do not have baccalaureate degrees. The secondary T&I teachers *do* average 17 years of occupational experience.

Is this an acceptable practice? Personal testimony and anecdotes from the literature and conferences indicate that occupational experience can indeed substitute for formal education. There is also

the 75-year old philosophy, first stated in Prosser's theorems, that indicates the more occupational experience accumulated by the instructor, the better will be his or her teaching. Further, the basic belief of many vocational educators is that one must have experienced his or her craft extensively to teach it, and that knowledge gleaned on the job can, and indeed should, substitute for more formal knowledge acquired in higher education classrooms or through extensive professional development programs.

But the cumulative evidence simply does not support the practice. Drawing on 23 studies or commissioned reports over a period of 40 years, the 1994 *National Assessment of Vocational Education–Final Report to Congress* concluded that extensive occupational experiences confer no particular benefits on vocational teaching. NAVE did find that a few years of occupational experience have a positive impact on vocational teaching, and this is certainly true for vocational and technical teachers who are in their early years of teaching. Further, cumulative studies from the National Center on the Educational Quality of the Workforce indicate that teachers' formal postsecondary education (i.e., associated with college and university degrees) is positively associated with desirable teacher and student outcomes. Simply put, the amount of formal education one possesses is a positive predictor of successful teacher performance and student outcomes. Professional training and a formal education do make a difference.

Inservice Education

At the macro or national level there is little evidence that inservice teachers are being prepared philosophically, systematically, or substantively with the content and processes identified with reform initiatives focused on vocational and technical education such as the reform themes identified at the beginning of this chapter. According to information in the 1994 NAVE report, there continues to be little academic content in vocational classes and less occupational content in academic courses. Vocational and academic teachers, for the most part, exist in two different worlds, at least in our nation's high schools.

Several studies and authors have concluded that much of inservice education is largely ineffective, lacking in substance and follow-through, and often doesn't get at the theoretical underpinnings or applications that are necessary to initiate and sustain changes.

Seemingly, there's very little time provided in the school calendar for teacher inservice education and certainly not the time or the processes needed to bring about long-term, substantive change implied in the various reforms proposed for education. Further, the entire system of vocational and technical teacher education inservice delivery is largely untapped from a research standpoint. There seems to be little descriptive, empirical, or evaluative data to provide direction as to what does and doesn't work, what is and isn't needed, and how best to achieve cross-curricular integration and quality programs and processes for all students.

NAVE reported some survey and case study data that indicated most schools, school districts, or consortia (ranging from 61% of postsecondary institutions to 85% of consortia and urban schools) spent funds on staff development. The dollars apparently were used for curriculum development or modification, staff development to support integration, and "other" forms of staff development.

Further, state departments also made available inservice training with Perkins funds in at least five topical areas in 1992-93: integration of academic and vocational education, tech-prep programs, student assessment and performance evaluation, serving vocational special populations, and curriculum related to all aspects of industry.

The scope, nature, amounts expended, and quality of the inservice education, however, have not been described or assessed. There is some indication that relatively small amounts of federal grant money from Perkins went to inservice education, and these funds were mostly used to send people to regional and national meetings. A general review of the five-volume *National Assessment of Vocational Education* (Boesel, 1990-1994) reveals that vocational education, especially secondary vocational education, has achieved, at best, mixed results and thus, by extrapolation, the inservice education of teachers probably has either achieved mixed results or is nonexistent for vast numbers of teachers. Inservice teachers simply haven't been adequately prepared to bring about the substantive changes envisioned in national reform reports and federal legislation. The *National Assessment* was very clear in its conclusions and recommendations that vocational education must become part of a new American system of education and training and that far more emphasis must be placed on teacher education as the key to program improvement within this system.

College and University Degree Programs

Colleges and universities have long been providers of teachers for public vocational and technical education programs, especially at the secondary level. This training has primarily been through an undergraduate major in one of the traditional vocational education subject areas: agricultural education, business education, distributive or (now) marketing education, home economics education or (now) family and consumer science education, industrial arts or (now) technology education, and perhaps others such as trade and industrial education or health occupations education. For the most part, vocational and technical teacher education continues to follow this very traditional, subject-specific model.

These traditional programs have suffered major enrollment declines in recent years; perhaps as many as one-third of them have been either eliminated, combined with other majors, or reduced to a very small student census and thus produce very few teachers. This is especially true where programs existed in colleges of agriculture, home economics, business, and technology. It is less true for programs in colleges of education, and indeed, vocational and technical programs therein are beginning again to show enrollment growth.

The following is a synthesis of selected findings and some conclusions emanating from various studies and reports on vocational and technical teacher education at U.S. colleges and universities appearing in the literature since 1990. It is important to note that the following do *not* typify all vocational and technical teacher education, its various subject areas, at all colleges and universities, in all states, and at all times within the past five years. There are certainly exceptions, exemplary programs and practices, and multi-faceted efforts underway to reform–even transform–programs at various universities in various states. The following, however, speak to the overall map of vocational and technical teacher education in the United States as gleaned throughout the past five years.

1. The theory of knowledge to undergird vocational and technical teacher education as we enter the 21st century and the technological/service/information workplace revolution has not been adequately researched or debated by scholars or practitioners of vocational and technical education. Further, and evolving from this epistemology, the knowledge bases to form teacher education programs, curricula, practices,

standards, and measures have yet to be codified. The basis for these elements of effective curricula has yet to be researched, drawn from the wisdom of practice, or even imagined at a satisfactory level to warrant designation of vocational and technical teacher education as a profession. More positively, there are efforts underway to do so–some in specific subject areas–sponsored by such groups as the National Association of Trade, Technical, and Industrial Education, the National Business Education Association, and the University Council on Vocational Education (see Chapter 3).

2. In general, vocational and technical teacher education has not been a principal player at the table at those colleges and universities that are in the process of reforming significantly their teacher education programs. In studies conducted by the National Center for Research in Vocational Education (NCRVE) and the University Council on Vocational Education (UCVE), only 6 vocational teacher education units reported that they were principal players in the design of efforts to reform teacher education comprehensively at their institutions of higher education.
3. Colleges and universities have diminished greatly their capacity to produce teachers for our nation's systems of vocational and technical education. There are probably fewer than 100 vocational and technical teacher education programs with at least four or more programs at colleges and universities with comprehensive teacher education programs (an N of at least 1,200). Attrition has been particularly pronounced in single-subject program areas administered in non-education academic units. On a positive note, NCRVE and UCVE studies found that programs administered collaboratively in a comprehensive unit identified with vocational and technical education in a college of education are enjoying increased growth in student and faculty census, research funding and productivity, and general funding.
4. The faculty of vocational and technical education who actually teach teachers to teach has diminished greatly; however, many of these (former) teacher educators continue to be employed at colleges and universities, but as instructors of technical subject matter, cooperative extension agents, or

are involved with training and development for students enrolled in non-teaching option programs. In 1989, the profile of the typical vocational teacher educator was a middle aged (i.e., nearly 50), white male (except in business education and home economics with a predominance of white females) who had been working in higher education for 16 years; 11% planned to retire within 5 years.

5. The required academic program of study of a vocational teacher education undergraduate student was 128 semester credits; however, one NCRVE study (Finch, Schmidt, Oliver, Yu, & Wills, 1992) conducted at Southern colleges and universities found–by analyzing graduates' transcripts–that students had actually completed credits totaling considerably more (i.e., 146.5). In this transcript analysis study, general education deficiencies were noted especially in mathematics, science, and other general areas thought to be important in preparing teachers to integrate vocational and academic education. Nearly all general education courses were taken from lower-division offerings and were often transferred from community colleges or technical institutes. In general, students did bring to their first jobs as vocational teachers extensive course work in subject matter (43 credits required, 50 typically completed), industry- or business-related occupational experiences, some preparation to work with students deemed at-risk or having special learning needs, a course in computer applications, preparation on advising vocational student organizations, and 38 credits in various education courses which included clinical practice (typically 10 credits in student teaching).
6. In a study done of UCVE institutions for the *National Assessment of Vocational Education*, no college or university reported substantive reform in administrative structure, program, or curriculum designed to integrate academic and vocational education—the major vocational and technical education curriculum reform initiative. Vocational and technical teacher education students are being informed of such major initiatives as tech prep, school-to-work opportunities, and integration in existing methods and curriculum courses–primarily through class lectures and discussions, guest speakers, readings, and video

teleconferences. However, no substantive structure, theoretical analyses, or collaborative activity had been undertaken.

FRAMING THE AGENDA FOR THE FUTURE

We are at a critical moment in vocational and technical education, especially at the high school level. The job to reform the education of our young people so as to enable all of them to move successfully into the 21st century workplace and concomitantly prepare them to enter postsecondary education may loom as one of the greatest challenges of contemporary public schools.

The key to successful education reform may well rest with knowledgeable, well prepared teachers. Schools and other educational environments need teachers who are professionals in every sense of the word. They must be knowledgeable of the 21st century workplace, the education and training needs of the workforce, and the processes that are inherent to prepare students to be successful in those workplaces.

Good teachers know their learners well, are committed to student learning, and are pedagogically skilled to insure that all students learn. Further, effective teachers are lifelong learners themselves and recognize that it takes thousands of hours of acquiring new knowledge and professional education to become a truly good teacher.

In the past 20 years, the knowledge bases for teaching and teacher education have grown tremendously. We simply know much more today about how various segments of students learn, think, remember, perceive, connect, form associations, solve problems, and transfer knowledge to ill-structured or new situations. We know that students learn at different rates, in different ways, in different environments, with different methods, and respond in different ways to different stimuli. We also know much more about the complex but important relationships between students and teachers. And, we now know more about how to teach teachers the things that they need to know and need to be able to do.

Similarly, workplaces have changed drastically and will continue to do so. To be successful employers and employees throughout their lives, all students must be well prepared in all manifestations associated with learning and its applications in workplaces. And just like their teachers, all students will need to be continuous, lifelong learners.

Many colleges of education nationwide have made great strides in incorporating new understandings of learning and teaching into their curricula. Perhaps at least 100 are heavily devoted to transforming their programs into new paradigms of program, curriculum, and instructional reform. Vocational and technical teacher education needs to be a partner in these reform efforts–and not apart from it. It has much to learn from the various reform efforts. And, it has much to offer them.

Drawing from the more salient themes that seem to be a part of the major reforms, while at the same time recognizing the unique and emerging epistemology associated with vocational and technical teacher education, the following are offered as major underpinnings for reform and change in vocational and technical teacher education.

Professionalism

An essential tenet in all reform efforts is to make teaching, once and for all, a bona fide and respected profession. There are many dimensions to a profession, and perhaps teaching has a long way to go to be considered a profession comparable in public perception to law, medicine, or architecture. Nevertheless, professionalism is a prominent foundation to educational reform, and vocational and technical teacher education should embrace it.

The major elements of a profession are the ability of its members to establish requirements for entry and training in the field; define the nature of the work, the structure of the job, and the authority that governs it; identify and codify a knowledge base; develop and monitor accountability measures; enforce a code of ethics with special concern for clients; prepare practitioners to exercise a great deal of autonomy–and all these elements are based on interpretive and applicative knowledge. Standards, criteria, and assessment accompany each component of professional practice.

Epistemology

The theory of knowledge to underpin that which is taught in vocational and technical teacher education programs is ripe for debate. What is it we know and how have we come to know it? Epistemology is concerned with the nature and scope of knowledge, its presuppositions and bases, and its general reliability of the claim to knowledge. It includes examining universals, cause and effect, empiricism, intuition, data, claims, and reasoning. What is the basis

for that which we are to teach and students are to learn, and how have we come to know this? The scholarship to underpin the knowledge base for 21st century vocational and technical teacher education has yet to be examined rigorously, codified, and postulated to its professionals for scrutiny and testing.

It appears as though the epistemology for vocational and technical teacher education will be drawn from a variety of historic and evolving disciplines that underlay education for workforce preparation: sociology, economics, technology, and education, as well as the more traditional academic areas of mathematics, science, language arts, and the social sciences.

Knowledge Bases

Closely related, contemporary knowledge bases for vocational teaching and teacher education—as emanating from its epistemology—have yet to be adequately debated and codified. Simply put: What is it vocational and technical teachers need to know and do? An even tentative answer to this essential question is imperative as we continue to move toward the 21st century and address the significant changes in the workplace and in the needed preparation of the workforce of the future.

In extracting cues from other knowledge-based frameworks for subprofessions within the teacher education profession, knowledge bases for vocational and technical teacher education may be further determined and codified in four broad areas: workforce education; general education and the liberal arts; knowledge of the learner, pedagogy, instructional technology, and professional education; and clinical practices.

Workforce education. This is knowledge of the subject matter–the curriculum content—that is to be taught to the learner. For prospective and practicing vocational and technical education teachers, the subject matter related to workforce education appears to be grounded in theory and practice in three sub-areas:

1. Common core subject matter–including sociology and economics of the workplace, work and family relationships, work and community relationships, general employability skills, how to enter and negotiate the workplace and career, work ethics, career and vocational development theory, customer and client relationships, labor and organizational relationships, leadership and management training.

2. Specialized subject matter—knowledge, skills, dispositions, processes, and technology needed to enter and advance successfully into a particular industry or occupational cluster; it includes knowledge of all aspects of the industry and the standards and credentialing associated with successful performance in the industry or cluster; it includes any unique technology identified with the industry or cluster.
3. Workforce preparation processes–such as the various initiatives identified with school-to-work opportunities, laboratory-based activities, simulations, tech prep models, career academies and majors, workplace mentoring, apprenticeships, clinical internships, and entrepreneurship.

General education and the liberal arts. Vocational and technical teachers need solid preparation in core academic subjects. This is crucial if they are to continue in their efforts to integrate successfully academic and vocational education for all students, position themselves as critical colleagues within the education profession, and acquire the literacy and critical thinking skills associated with effective teaching.

Specific credits, hours of instruction, and specialized subjects will always be a continuing source of debate and usually resolved through an accreditation or legislated mandate or a faculty committee. As a guideline, various commissions suggest that all preservice teachers need preparation in the social and behavioral sciences; mathematics and statistics; humanities, languages, and fine arts; and the natural sciences–probably 12 semester credit hours in each of these four major categories. Others often add technology, foreign language, health and physical education, and some form of cultural and global studies within the general education component. It is important to add that preparation in general education or the liberal arts cannot be the same old courses taught the same old way. Of particular note is the often cited observation that pedagogy in these courses must change and that some attempt must be made to contextualize these courses for the learner.

Knowledge of the learner, pedagogy, instructional technology, and professional education. The ability to demonstrate knowledge and effectively practice in each of these core domains of teaching is often the critical determinant in recognizing effective teachers. Much educational research has focused in these four areas in the past 20 years. The collective knowledge of the

teaching-learning process within a context of effective educational environments has been the linchpin in the crusade to establish education as a true profession. The explosion of research on learning and teaching has framed the reform effort in much of teacher education.

Knowledge in this broad professional education category ranges from the ability to manage such highly technical skills as preparing lesson plans, assessment instruments and processes, and software packages to evaluating research in human learning and development, cognition, and classroom socialization. It includes drawing on subject matter, general education, and learning theory to develop curriculum, choose diverse methods to match the learning styles of diverse students, and to anticipate results. Effective teacher education advances on to critical thinking and reflection, analyzes the ethical and social consequences of actions, articulates theory and practice, and continues to identify practices that correlate positively with student outcomes.

Technology has become a core area in the development of critical instructional repertoire for teachers. All teachers are expected to be skilled in multimedia instruction, electronic presentation, distance learning, basic computer operation, word processing, data management and analysis, electronics communication, selection of hardware and software packages, use of networks, and related ethics and impacts. The technology is not about learning technology for technology's sake but is closely tied in to research from the cognitive sciences and the use of technology to advance student learning.

Critical, too, for all teachers is a knowledge of educational history and philosophy, goals, outcomes, politics, financing, law, cultural environments, organizational phenomena, diverse institutions, and demands on curriculum. This knowledge is vital for vocational and technical educators whose instructional skills are increasingly needed in a variety of educational environments: public schools, technical institutes, community colleges, correctional institutions, business and industry, proprietary schools, and rehabilitation centers.

Clinical practices. There is an increasing body of knowledge that resoundingly supports extensive use of clinical practice in the preparation of teachers. Over 100 colleges and universities have created professional development schools that, like teaching hospitals

in medicine, provide their education students with intensively supervised internships linked to their coursework. All teacher education units accredited by the National Council for the Accreditation of Teacher Education (NCATE) require at least 10 weeks of student teaching. NCATE also calls for study and practice in a variety of communities, with students of different ages, and with culturally diverse and exceptional populations.

For prospective vocational and technical teachers, university-sponsored and faculty-supervised clinical practice should also include experience in an occupational cluster or industry related to the specialized subject matter the students are studying. Analysis of studies from various vocational and technical specialized subject areas have shown that some occupational experience (i.e., a university internship or up to two years of non-university supervised experience in a cluster or industry related to the subject to be taught) is valuable to teachers in vocational education, especially to those in their earlier years of teaching.

Lifelong Learning

An increasingly accepted theme that needs to become part of the professional culture of education is that learning to teach is a lifelong endeavor. It takes years of study, practice, reflection, more study, more practice, and more reflection to become a good teacher. Other professions, especially those whose prestigious perks are coveted by educators (i.e., medicine and law) have always required continuing education for license renewal, accreditation, or the right to continue to practice. Vocational and technical education must do so as well.

Theory and practices related to workplaces and workforce development will continue to evolve rapidly, as will the knowledge of theories and effective practices related to learning, pedagogy, instructional technology, and the education profession. Vocational and technical education professionals must continue to learn to insure that their clients continue to learn.

Of special note is the importance of working with novice vocational and technical teachers during their first few years in the profession. Studies completed by NCRVE researchers (e.g., Heath-Camp, Camp, Adams-Casmus, Talbert, & Barber, 1992) found too little assistance for beginning teachers; for the most part, they are being left to sink or swim. All novice teachers encounter some problems, but those

who were alternatively certified have additional problems and are not receiving adequate assistance. Less than fifty percent survive longer than 5 years in the classroom. Those who do survive the earlier years do so because of planned educational intervention programs such as enrollment in degree programs, solid mentoring, and extensive, substantive inservice education. Mentoring programs, assistance from colleagues, time to plan and reflect with colleagues, inservice education, and help with teaching materials and student learning are frequently cited as areas of imperative assistance for beginning teachers.

Accountability

Many factors summarily clustered under accountability are heavily responsible for reform in teacher education and indeed must undergird reform in vocational and technical teacher education. In general, the public was not particularly kind to teacher education during the 1980s. Over 1000 pieces of state legislation were put into place within a five-year period to mandate and govern changes in the way in which states prepare their teachers.

Accountability speaks to a lot of factors related to vocational and technical teacher education. Are colleges and universities really training teachers who can teach others what it is they need to know for the 21st century workplace? Does the college or university administrative unit in which vocational and technical teacher education is housed view the preparation of teachers as essential to its mission and goals? Is there sufficient enrollment? Funding? Equipment? Faculty who practice that which they (should) preach? Are there standards and measures? Most importantly, is there accountability about what is being taught, to whom, by whom, and for what purposes?

CONCLUDING COMMENTS

The primary purpose of this chapter was to bring concern, results of some theoretical discourse and data, and some directional thought about vocational and technical teacher education as we continue to set direction for the future of vocational and technical education–especially at the high school level. The major conclusions are that vocational and technical teacher education must change

substantially and that it is colleges and universities who must assume major leadership and responsibility for these changes.

It is not easy to set forth a position or statements that challenge sacred principles and historical practices, especially given the relative absence of reliable data or a conceptual framework. Nevertheless, even the most traditional vocational educator must agree that the world is changing–at least for most people, in most communities, some of the time. And even the most revolutionary of the visionaries will probably agree that it is easier to rebuild (transform?) a system already in place, even with its major flaws and shortcomings, than to create one.

What is relatively clear in all of the reform literature is that there are major changes in society, in the economy, in the workplace, and major changes needed by the workforce to adjust to all the changes. Individuals who do not learn to succeed at school cannot survive in this changing, global economy. Consequently, schools are increasingly being pressured to change as well and, in so changing, guarantee that all students (rather than just a relatively small percentage) will learn and continue to learn throughout their lives.

As schools are reformed to focus on student learning and as curricula continue to blur, teacher preparation must also change to produce teachers with the knowledge and skills that are needed in high quality educational environments. As is well cited in the literature, what teachers know and can do is the most important influence on what students can learn. It is increasingly imperative that all teachers be well prepared to teach all students who come to them for learning. Let us begin at our colleges and universities to insure that our teachers can do so. And what is it vocational and technical teachers need to know and demonstrate that they are able to do? Let the debate begin.

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2

Building a Context for Reform

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> In 1870, only 7 percent of the relevant age group went to high school and only 1 percent to college. By 1970, 90 percent of Americans aged fourteen to seventeen were in high school, and by the 1980s a majority of Americans of college age were receiving some higher education. (Bellah, Madsen, Sullivan, Swidler, Tipton, 1991, p. 146)

With the dramatic increase in our base population in the 125 years since 1870, and with the correspondingly dramatic increase in the proportion of this population who receive secondary and postsecondary education, it is inevitable that the diversity of students who are being educated in these settings will increase dramatically. Yet even taking into account the community college movement during the latter half of this century, much of the structure, governance, curriculum, teaching and assessment processes, and learning expectations remain remarkably similar to what they were in 1870. The same cannot be said of the workplace. Today, in great contrast to a century ago, employers require many more skills from their entry-level employees. Advanced technology and increased access to knowledge have transformed the types and amounts of knowledge and skills expected of America's workforce. Even though students are graduating from the nation's high schools and participating in post-secondary education to a far greater extent than in the past, the United States has been unable to maintain its preeminence in the world's economy (Fitzgerald, 1986; Owens & McClure, 1989). While much of this decline in our dominance of the world economy is beyond our control, there have been several recent reports confirming that a gap exists between the current skills of the workforce and the reported skills and levels of those skills needed by industry (Carnevale, Gainer, & Meltzer, 1991; Secretary's Commission on Achieving Necessary Skills [SCANS], 1991).

Just as the demographic profile of today's secondary and postsecondary students has changed, the demographic profile of today's labor pool is significantly different from that of even a few decades ago. The baby boom era has passed, resulting in a declining number of entry-level workers (Feldman, 1987; Lee, 1988). A larger share of the entry-level workers of the future will be composed of women, minorities, and other historically disadvantaged groups (Carnevale et al., 1991; Pritz, 1988). In the past, these groups have been less successful in school and often lacked some of the basic skills deemed necessary by employers for successful entry into the world of work. Recently, political and legislative initiatives have begun to address the rapidly diminishing ability of schools to prepare students with these basic skills and the increasing difficulty of businesses to enculturate students who lack these skills into their organizations.

Although there is little agreement about the precise causes of this inadequate preparation, experts do agree that the causes are complex and highly interactive. For example, more and more students are coming to school nutritionally and emotionally undernourished. Our classrooms, from kindergarten to college, are increasingly more culturally and academically heterogeneous, and the number of students available to enter the labor force is declining. Fiscal resources are decreasing; the costs of educating workers beyond high school is escalating; and there is increased competition for state resources and increased expectations from the public for accountability. All of these issues impact the ability of public education to increase student learning in schools. If students do not leave school with the skills necessary to enter the workforce, how must we change?

As questions arise with increasing frequency about the efficacy of public education, so do ideas about how to reform public education to address these questions. Many of these calls for reform assume that the direction of causality runs a complex but direct path–from ineffective schools to increased social problems, loss of international competitive advantage, and high unemployment of youth. This chapter will attempt neither to disentangle the complexities of these hypothesized paths, nor verify their validity. Rather, its purpose is to describe the past decade's major reform movements in the public schools, general teacher education reform, and, more specifically, vocational teacher education reform. The chapter will conclude with some recommendations for higher education reform in response to these various reform contexts.

GENERAL EDUCATION REFORM INITIATIVES

Criticism From Outside the Profession

Calls for educational reform during this past decade, however familiar in content, have been alarming and strident enough to have finally pressed the nation's educational and political leaders to demand systemic change. The most outspoken critics of the nation's schools have frequently come from outside the educational profession–from politicians, taxpayers, and the business community, who ultimately carry the financial burden for education. Perhaps the most influential reports calling for the reform of public education, however, came from two presidential initiatives and the Carnegie Foundation.

A Nation at Risk. The National Commission on Excellence in Education was formed in 1981 to address the failure of students in the United States to perform as well as students from other developed nations on standardized achievement tests. The Commission, directed by then Secretary of Education T. H. Bell, assessed the quality of education in the United States, compared that quality to other developed nations' educational achievements, and ultimately described the problems that "must be faced and overcome" (National Commission on Excellence in Education, 1983, p. 2).

The tone of the Commission's report, *A Nation at Risk: The Imperative for Educational Reform* (1983), was one of imminent danger. Replete with images of threats to national security and declining competitive advantages, the report pleaded with the nation to work for educational reform in five specific areas:

- A strengthening of basic high school graduation requirements to include four years of English, three each of mathematics, science and social studies; and one-half year of computer science;
- An adoption of minimum standards of achievement in each of the aforementioned basics;
- An increase in the amount of time devoted to each of the basic subjects;
- Improvement of both teacher preparation and the teaching profession, including raising admission standards of teacher preparation programs, increasing teacher salaries, an 11-month contract for teachers, alternative certification in

areas of teacher shortages, incentives to attract outstanding students to the profession, and involvement of master teachers in teacher preparation programs; and

- Accountability of the nation's educators and elected officials to provide leadership and fiscal support for the reform agenda.

The report was widely read. Its tone of looming national peril attracted the attention of both local and national leaders during a time of economic recession.

A Nation Prepared. In January of 1985, less than two years after publication of *A Nation at Risk*, the Carnegie Corporation established the Carnegie Forum on Education and the Economy, "to draw America's attention to the link between economic growth and the skills and abilities of the people who contribute to that growth, and to help develop education policies to meet the economic challenges ahead" (Carnegie Forum on Education and the Economy, 1986, p. iii).

Building on the groundwork established in *A Nation at Risk*, the Carnegie Forum aimed its attention directly at the teaching profession. In 1986, the Forum published *A Nation Prepared: Teachers for the 21st Century*. The report described a dismal teaching force whose academic preparation and test scores had substantially declined between the years of 1974 and 1982, whose salaries were comparable to occupations not requiring a college degree, and whose level of preparation declined even further as teacher shortages left vacant positions unfilled.

The Forum concluded that the United States could remain competitive in the global marketplace only by demanding much greater academic achievement from the nation's high school graduates. This could be achieved, they stated, only by greatly increasing the knowledge, skills and working conditions of the nation's public school teachers. They made eight specific policy recommendations:

- To establish high knowledge and skill standards for all teachers, and to certify, through a national standards board, that teachers meet those standards;
- To create school environments that permit the teachers to determine how best to help their students achieve state and local goals;
- To create career ladders where lead teachers would account for high standards within the schools;

- To require a bachelor's degree in arts or sciences, thereby eliminating degrees in education;
- To develop graduate-level teacher preparation programs;
- To recruit qualified minority students for teaching careers;
- To create teacher incentives directly tied to student and school performance, and to provide support necessary to achieve student excellence; and
- To make teaching salaries and opportunities competitive with other professions requiring equal education.

The Forum's report invited the nation's stakeholders–teachers, state policy leaders, community leaders, higher education leaders, and students–to become involved in reforming the teaching profession. Spurred on by the Forum's work, George Bush, the President of the United States at that time, as well as governors and other high ranking policy makers, weighed in with proposals of their own.

Goals 2000. In 1989, President Bush convened the highly visible "Education Summit" with the nation's governors. Armed with numerous data-driven calls for reform, including *A Nation at Risk* and *A Nation Prepared*, the state leaders set out "to change the national educational emphasis from process to performance, from complacency to high expectation" (*The National Education Goals Report*, 1992, p. iii). Lamenting the nation's fall from global superiority, the governors, led by Arkansas governor Bill Clinton, committed themselves and the country to achieving the following six goals, "The National Education Goals," by the year 2000:

1. All children in America will start school ready to learn;
2. The high school graduation rate will increase to at least 90 percent;
3. American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter, including English, mathematics, science, history, and geography, and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy;
4. U.S. students will be first in the world in science and mathematics achievement;
5. Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship; and,

6. Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

In March 1994, Congress placed the slightly modified six original goals and two additional goals into statute in the bill "Goals 2000, Educate America." Changes to the original goals included adding foreign languages, civics and government, economics, and art to the list of core subjects. The new goals included teacher education and professional development (providing access to programs for continued improvement) and parental participation (promoting partnerships to increase parental involvement in the schools).

Although these reports clearly linked the national economic success of this nation with better prepared students, they failed to include a serious discussion of the vocational/technical needs of an educated citizenry. In fact, by focusing almost exclusively on increased academic standards, the reform reports reduced the visibility of vocational education in the national reform agenda. Nonetheless, these three reform reports–*A Nation at Risk*, *A Nation Prepared*, and *Goals 2000*–reflect the tone and national force behind a decade of intense criticism of public schools and, indirectly, teacher preparation programs. These demands for change, seismic in proportion, have sent shock waves throughout the country's educational systems. The calls for reform from outside the educational arena have been accompanied by many from within the profession that also speak to the need to change the way children are educated in the United States.

Criticism From Inside the Profession

Suggestions for reforming schools and teacher preparation programs have by no means been limited to external voices. The difference between the internal and external criticism and recommendations for reform, however, often revolves around the fundamental purpose of education. Those critiquing schools from outside the profession (e.g., politicians, business leaders) focus instrumentally on the skills (or lack thereof) that workers bring to the workplace. However, inside the profession the strongest voices of criticism center on issues of equity–providing the best education possible to *all* children–and teacher preparation–educating future teachers to prepare them better for their roles in the public schools. While discussions of equity issues continue to include high drop-out

rates and low achievement scores, these internal reformers more commonly examine and consider *who* is lagging behind (Goodlad & Keating, 1990).

Advocates for students who have been disenfranchised or who are poor (Kozol, 1991; Oakes, 1985), who are culturally diverse (Bennett, 1995), and students who are otherwise "at risk" (Brown, 1991) stress the need for equitable education for all students in our schools (Nieto, 1992). Our schools *are* working for some students; they *are not* working for all students. Criticisms of teacher preparation, however, commonly coalesce around the static nature of higher education institutions and their seeming inability to change. For example, Johnson and Foster (1990) described the major calls for teacher education reform since the early 1900s and noted the similarity in identified concerns throughout the years: "A review of prior reform movements shows that little has changed; the same problems in teacher preparation are being addressed and the same solutions are being offered today as were proposed in prior reform movements" (p. 10).

Regardless of the history of higher education's resistance to change, it is nonetheless important to examine the current reform landscape in teacher preparation programs. Some of the harshest criticisms come from John Goodlad, an internationally recognized scholar who is currently the director of the Center for Educational Renewal at the University of Washington in Seattle. Believing that most calls for reform were based "on reefs of ignorance" (Goodlad, 1984, p. 16), Goodlad launched a massive study of schools and teacher preparation programs across the country. The study took several years to complete and resulted in 35 technical reports and ultimately the book, *A Place Called School* (1984). Based on what Goodlad and his colleagues found, *A Place Called School* concludes that

> the agenda of school improvement is formidable. It [the study] identified the need for clarification of goals and functions, development of curricula to reflect a broad educational commitment, teaching designed to involve students more meaningfully and actively in the learning process, increased opportunities for all students to gain access to knowledge and much more. Significant improvement will come about not by tackling these problem areas one by one, but my addressing all or most of them as a system. (p.

271)

A major difference between his reform agenda and those previously discussed centers around Goodlad's proposal to delegate the responsibility for *how* reform is to occur to local schools. The state's role, he asserts, is to provide both equity across the range of schools and clearly stated goals for which schools are held accountable.

Goodlad has presented the teacher education profession with 19 postulates (Goodlad, 1994), which he believes must be achieved if reform is truly to improve the nation's schools. Teacher preparation programs must, for example, restructure simultaneously with public schools. Furthermore, colleges and schools of education must gain status and prestige equal to other colleges on the university campus, clarify their mission and identity, clearly define and instill pride in their student body, and drastically improve the coherence of the curricula that leads to certification or licensure.

Another group of educators actively involved in calls for reform is the Holmes Group, a consortium of nearly 100 American research universities committed to making programs of teacher preparation more rigorous, connecting them more tightly to liberal arts education, conducting more applied research on learning and teaching, and modeling, more thoroughly, good practice in the schools. The Holmes Group published three books clarifying their agenda in this era of reform: *Tomorrow's Teachers* (1986), *Tomorrow's Schools* (1990), and *Tomorrow's Schools of Education* (1995).

In *Tomorrow's Teachers*, the Holmes Group calls for career ladders and environmental changes within the public schools. The book also supports moving teacher preparation programs to the graduate level, increased admission standards to teacher preparation programs, and faculty salaries commensurate with educational achievements. With *Tomorrow's Schools*, the Holmes Group advocates the creation of "professional development schools" where university students studying to become teachers work in partnership with the faculty of both public schools and universities. These professional development schools, housed in existing public schools, will (a) create better learning opportunities for novice teachers, (b) help to maintain the skills of practicing teachers, and (c) create opportunities for increased research on schools and teacher education. Most recently, *Tomorrow's Schools of Education* extends the discussion of teacher education with several distinct recommendations upon which the 250 members of the Holmes Group can embark to raise their standards of quality. These recommendations include (a) a

wider design for the preservice curriculum, (b) increasing faculty who work directly in the schools, (c) increasing the diversity of the preservice student body, (d) shifting the locus of work from campuses to schools, and (e) interconnecting schools of education for information sharing.

Another reform-minded educator, Theodore Sizer, is chairman of the Coalition of Essential Schools at Brown University. He uses a fictional setting (Franklin High School) to describe his thoughts on today's schools: "Franklin is, if nothing else, ... fettered by routines of long standing. The result is a cacophony of jumbled practices orchestrated only by a complex computer-driven schedule whose instrument is a bell system and whose ushers are assistant principals" (Sizer, 1992, p. 3). Sizer's Coalition schools (over 500) are based on four beliefs: "the purpose of school is to help students think; people learn best when truly engaged in something important; you can't teach a student unless you know him or her well; and exhibition is superior to tests" (Goldberg, 1993, p. 55).

These efforts to reform schools from within the profession seem to differ from external efforts in important ways. One fundamental difference is the purpose of schooling (preparing tomorrow's skilled workers vs. providing equal access and opportunity for quality of life). Additionally, Goodlad and Sizer agree that top-down reform will not make the nation's schools better places. They believe that individual sites must do what is best for their own children and that the schools' teachers, guided by visionary leaders, must decide what is best for their children (Asayesh, 1993; Goodlad, 1984).

Between 1983 and 1993 education has received a great amount of critical attention. Table 1 summarizes some of the recommendations for teacher education reform that have emerged from this recent spate of attention during the last decade. These reform initiatives include revisions to certification and/or licensure, increased professionalization of the disciplines, increased efforts to recruit and retain ethnically diverse faculty, increased autonomy of teachers, salaries comparable to other professional areas, increased quality of working conditions for teachers, and the integration of academic and work-based skills.

Effects of a Decade of Reforms

Every state in the nation has been affected by the reform efforts. For example, every state except Pennsylvania is developing or has

Table 1

Summary of Reform Initiatives

Issue	Carnegie	Holmes	Goodlad	Sizer
Recruitment and Admission	• Actively recruit minority students • Increase entrance requirements to attract higher quartile talent	• Raise entrance standards • Increase minority enrollment	• Increase the prestige of teaching as profession • Seek candidates who show commitment to moral, ethical, & enculturating responsibilities of teaching • Increase standards/emphasize excellence • Emphasize equity/recruitment of minorities	• Improve teaching conditions to attract quality candidates
Teacher Prep	• Abolish undergraduate teaching degree • Replace with two-year graduate teacher preparation program • Reduce perceived low status of teaching • Preserve adequacy of preservice preparation	• Eliminate undergraduate program • Connect Professional Development Schools to higher education • Establish rigorous exams • Increase program rigor	• Understand teaching and learning in a democracy • Create Centers of Pedagogy for all faculty • Model conditions for learning • Increase value of teacher ed. in univ. & society • Tie action of schools to inquiry of universities • Stimulate collaborative inquiry • Consolidate teacher education under one dept. • Emphasize professional development schools • Work with public school faculty/content faculty	• Increase teachers' scholarship • Encourage teachers to be coaches for future teachers • Design exclusively school-based training
Certification	• Formulate a national cert. board & system • Create bifurcated system of cert. and promotion • Award certification after probationary period	• Confer full certification for novice & advanced • Enhance standards for entry into profession • Present certif. after probationary period	• Evaluate professional exams by a state education board similar to other professions • Utilize enlightened professional-driven requirements for accreditation • Eliminate alternative certification	• Eliminate alternative certification • Pass examinations for university diploma • Utilize exhibitions for assessment of learning
Teacher Roles and Duties	• Create lead teachers • Decrease non-teaching duties • Reduce bureaucracy • Tie ed. and economy • Increase teacher autonomy	• Create better working conditions for teachers • Transform school into place to work and learn	• Increase responsibility and discretion with curriculum • Develop coherent programs of study • Provide continuous prof. development inquiry • Tie general ed. and vocational ed. closer together • Prepare students for living and working in a democracy	• Reduce bureaucracy • Increase teacher's autonomy • Emphasize thinking skills • Generalists before specialists • Integrate curriculum • Active focus on students • Eliminate separate tracks
Staffing	• Teacher career ladders • Improve work conditions • Develop "lead teachers" • Reflect cultural diversity	• Build career ladder based on experience • Reflect cultural diversity of faculty	• Increase support staff • Build parity with other professional schools • Reflect cultural diversity of faculty • Involve educ. & content faculty in teacher prep.	• Restructure top-down hierarchies • Increase professionalism
Salary	• Salaries comparable to other professions • Teacher incentives based on student performance	• Salaries commensurate with educ. achievement • Compare salaries to other professions	• Make comparable to other professional careers	• Create meaningful incentives for teachers

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developed content standards, and 40 have developed or are developing performance standards. Thirty-eight states report systematic efforts to achieve equity in education, 47 states now offer statewide assessments, 43 states include professional development in their reform efforts, 27 states have instituted site-based management, and 46 states report that both technology and challenging curricula are critical elements of their reform plans (Inman & LaBouve, 1994). Other reform efforts underway include state-mandated teacher testing (e.g., The 1991 Educator Licensing Act of Colorado) and changes in the accreditation process for teacher education programs by the National Council for Accreditation of Teacher Education (NCATE) (1995). NCATE has revamped its standards to reflect the initiatives associated with the *Goals 2000* legislation and to increase the professionalization of teaching. Chapter 5 discusses how state content standards have been developed in ways that are consistent with revisions to the NCATE standards.

Although significant changes are underway, educators are critical of many of the current reforms. Clark and Astuto (1994) lament the top-down nature of national- and state-level reforms. The establishment of state-wide testing, they say, will threaten districts that have high concentrations of poverty, but will not improve the conditions in which their children live. Implementing site-based management in traditional schools, they continue, will place an additional burden on teachers who are already overworked and who are, furthermore, untrained to take on such roles. Clark and Astuto believe that national testing and tight control over curricula will only lead to less motivated teachers and students. "External agencies should be worrying about how they can help and support these school units," they say, "not about how they can dominate them. The current repressive and retrogressive policies will have to be rejected and replaced by teacher- and student-centered reform" (p. 520).

Asayesh (1993) interviewed four top education reformers: John Goodlad, Henry Levin, Phillip Schlechty, and Ted Sizer. He asked them to comment on the effects of *A Nation at Risk*. They agreed that the report focused much needed attention on education, but they also agreed that the report inaccurately represented the problems. Asayesh summarized the reformers' comments: "The report helped put educators on the defensive, generated regulations and mandates imposed from above, created rigidity and stifled creativity, and led to an atmosphere of political polarization susceptible to facile and dangerous solutions" (p. 9). The interviewees agreed that reform is

critical, but that local conditions, local schools, and teachers must be involved more directly in the efforts.

Mary Hatwood Futrell, president of the National Education Association from 1983 to 1989, believes that true reform has not yet taken place. She divides the past decade of reform into four "waves" (Futrell, 1989). The first, she reports, was from 1983 to 1985, when states were busy passing mass legislation attempting to control and regulate teachers and schools. (More than 700 statutes were passed by state legislatures during that period.) Reaction to this top-down effort ushered in the second wave, examining local schools and teachers. During this period, from 1985 to 1986, schools moved toward site-based management and grass-roots, collaborative reform efforts. Equity began surfacing as a critical condition of educational excellence. The third wave, according to Futrell, was characterized by economic trends. The need to reassert global economic superiority drove efforts from 1986 to 1989. The fourth and current wave attempts to incorporate the importance of local efforts and bottom-up decisions, yet also recognizes that schools must define their goals in future economic terms. "We need education that serves our *national* interests even as it awakens us to the common interests we share with all nations and peoples" (Futrell, 1989, p. 14).

Reports that examine the effects of these reforms include both discouraging and encouraging news. For example, little progress has been made toward the eight goals in *Goals 2000* (*The National Education Goals Report*, 1992). Arthur Wise (1991), President of NCATE, agrees with many of the plans and observations about the reform of teacher education but notes that we must go farther. The education of new teachers in professional schools will have little effect if we do nothing about the current lack of professionalism. Practices such as the hiring and assignment of emergency, alternately certified teachers, should not be allowed. In addition, he states that of the 1200 universities with teacher education programs, only 503 are fully accredited by NCATE.

Wise asserts that reform must occur on two levels: quality control and professionalization. Quality control must be exercised by increasing the requirements, test scores, and grade point averages of applicants who enter teacher education programs. Professionalization needs to be improved through the implementation of standardized licensing and review boards. These reforms, however, must come from within the profession.

What can be learned from a decade of reform and its effects on schooling? Probably the most salient conclusion rests in the locus of reform efforts. It is becoming increasingly evident that systemic reform of schooling in this country can be driven neither by top-down mandates nor by bottom-up, local control efforts. As Clune (1993) recently concluded,

> A practical, change-oriented system built from the bottom up turns out to be less mysterious and more clearly challenging than its centralized counterpart. No system is perfect, however, and a decentralized system has its own problems, perhaps the greatest of which is the tendency to stop short of systemwide change. (p. 250)

Perhaps the most efficacious reform will come from a union of top-down and bottom-up efforts. Clearly, however, more widespread research of this "fourth-wave" form of systemic change will be necessary to ascertain just how these two sources of reform should best be joined.

VOCATIONAL EDUCATION REFORM INITIATIVES

Like the calls for general education reform discussed earlier, calls for vocational education reform have also come from politicians, taxpayers, labor, and the business community. All are increasingly alarmed by the lack of preparation of youth for successful entry into the world of work. The vocational reform studies reported below highlight the national concern about the need to prepare students for the workforce.

Workforce 2000

The first of these reports commissioned by the U.S. Department of Labor, and published in 1987, was *Workforce 2000* (Johnston & Packer, 1987). This study projected a major shift in our economy from manufacturing to service oriented industries. The fastest growing jobs were projected to be in technical fields, sales, and in professional occupations requiring more education and skills than many of the unskilled labor jobs of the past. Thus, the report predicted increasing joblessness for the untrained worker and the need for more semi-skilled, skilled, and professional workers. The report indicated that jobs in high skill occupations would rise from

24 percent to 41 percent of the workforce. Education beyond high school, but less than a baccalaureate degree, was expected to be essential to be able to qualify for the higher wage jobs. In addition, *Workforce 2000* projected that there would be fewer youth to fill the jobs of the future and that workers in general would be older and more likely to be female, and/or disadvantaged. Changing demographics indicated that the workforce would be made up of an ever-increasing proportion of immigrants, women, and people of color. The impact of these trends suggests a growing income gap between more and less educated workers, an increasing emphasis on the need for a more educated workforce, and a discrepancy between the jobs of the future and the skills of the workforce.

The Forgotten Half

The Forgotten Half, published by the W. T. Grant Foundation (Commission on Work, Family, and Citizenship, 1988), urged the American public to deal with the 50 percent or more of 16-24 year-olds who were trying to enter the workforce or start families with little or no preparation. This report maintained that an increasing number of young adults are unlikely to attend any college. It also indicated that opportunities for this group are more restricted than they were even 15 years ago and that society will tend to see single-parent households increasing, home ownership declining, unemployment rates increasing, and a decreasing number of jobs with a future.

In terms of schooling, *The Forgotten Half* noted that schools have lost sight of the large number of students who do not attend college and that they have preoccupied their planning with those who do plan to continue on to college. Additionally, the study noted that increasing numbers of students are inadequately prepared for work or family life. Non college-bound youth need policies to encourage family support and community participation. Thus, the report called for (a) more business-education partnerships, (b) standards for student achievement, and (c) government incentives to employers for targeted jobs. Additionally, the study recommended increased funding for programs that encourage the transition from school to work, including cooperative education, internships, student apprenticeship, monitored work experiences, school enterprises, career information and counseling, and service learning opportunities in conjunction with classroom-based instruction.

America's Choice

Like earlier studies, *America's Choice: High Skills or Low Wages!*, published by the National Center on Education and the Economy (1990), echoed the state of the economy and the need for skilled workers. Its fundamental premise is that if our standard of living is to be maintained or improved, American society must improve the productivity of the workforce. The report indicated that front line workers must be educated and trained sufficiently to meet the challenges created by the changing demographics of the workforce. Increasing recognition by the business community indicates that schools have not set high academic standards for non-college bound students, which has led to a crisis in the preparation of the American workforce. Although 70% of the jobs in the year 2000 will require skills less than a baccalaureate, the educational system has focused on the 30% of our population who will complete a four year degree. The report concludes that "America may have the worst school-to-work transition system of any advanced industrial country" (p. 4). To deal with these complex problems, the commission recommended the following:

1. "A new educational performance standard should be set for all students by age 16. This standard should be established nationally and benchmarked to [match] the highest in the world" (p. 5). Students would take a series of performance-based examinations and be awarded a certificate of mastery, after which students would choose among preparing for work, entering a college preparation program, or studying for a technical certificate;
2. Given that more than 20% of students drop out of school annually, "states . . . should create . . . alternative learning environments for those who cannot attain the Certificate of Mastery in regular schools" (p. 6);
3. "A comprehensive system of Technical and Professional certificates . . . should be created for the majority of students . . . who do not pursue a baccalaureate degree" (p. 6);
4. "All employers should be given incentives and assistance" (p. 7) to invest in further training to continuously upgrade employee skills; and
5. Boards should be established to oversee school-to-work transition programs. These boards should coordinate school-to-work transition programs, technical and professional

certificates, and the implementation of work standards. (*America's Choice*, 1990, pp. 5-7)

SCANS Report

One year after the publication of *America's Choice*, the Secretary's Commission on Achieving Necessary Skills (SCANS) (1991) report was published by the U.S. Department of Labor examining the skills needed by the American workforce to compete in a global economy. A widening gap between labor skills required by industry and those presently held by workers indicated a need to reexamine the skills needed by American workers. Workers with good basic skills have found it easier to compete in the global economy and acquire more sophisticated skills. However, the report indicated that employers were dissatisfied with the degree of knowledge and skills of youth entering the workforce. The report concluded that as fewer young adults enter the workforce, employers will have to reach deeper into the lowest quartile of least prepared workers to meet their personnel needs. A large proportion of these individuals will lack the traditional basic skills of reading and writing. The report indicated that the following workplace competencies and skills were required of all workers:

Workplace Competencies. Effective workers can productively use

Resources—They know how to allocate time, money, materials, space, and staff;

Interpersonal skills—They can work on teams, teach others, serve customers, lead, negotiate, and work well with people from culturally diverse backgrounds;

Information—They can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information;

Systems—They understand social, organizational, and technological systems; they can monitor and correct performance; and they can design or improve systems; and

Technology—They can select equipment and tools, apply technology to specific tasks, and maintain and troubleshoot equipment.

Foundation Skills. Competent workers in the high-performance workplace need

Basic Skills—reading, writing, arithmetic and mathematics, speaking, and listening;

Thinking Skills—the ability to learn, to reason, to think creatively, to make decisions, and to solve problems; and

Personal Qualities—individual responsibility, self-esteem and self-management, sociability, and integrity. (SCANS, 1991, p. 6)

Numerous studies have examined the nature and extent of basic skills needed to be successful in the American labor force (Carnevale et al., 1991; Gloeckner, Cobb, Love, & Grant, 1992; Natriello, 1989; Pritz, 1988). The consensus on basic skills that has emerged from these studies and those discussed above appears to converge around the following categories: (a) learning to learn; (b) reading, writing, and mathematics; (c) communication; (d) problem solving; (e) personal/career development; (f) interpersonal skills; (g) organizational effectiveness; (h) technology; (i) science; and (j) family. These studies emphasize the need to link school-based learning and work-based learning. Like the reform initiatives discussed earlier, there appears to be a lack of congruence between public demands for change and education's willingness to acknowledge these demands. While some reformers (i.e., Goodlad's agendas and the Carnegie reports cited earlier) emphasize a need to link academic preparation and work, it is apparent that studies of vocational reform continue to remain parallel and separate from academic reform initiatives, although both demand systemic changes in schooling and teacher preparation.

TEACHER PREPARATION IN VOCATIONAL EDUCATION

While the majority of calls for reform in vocational teacher education have come from outside of education, vocational teacher educators have begun to examine the viability of their teacher preparation programs as they relate to legislatively-driven reform efforts in general vocational education, such as the Carl D. Perkins Vocational and Applied Technology Act Amendments of 1990, and more recently, the School-To-Work Opportunities Act of 1994. These

laws have challenged decades of relatively stable federal programming for vocational education by encouraging the integration of vocational and academic education, mandating services for students with the greatest need, focusing more directly on the transition from school-to-work for all public school students, and requiring the articulation of technical preparation curricula between secondary and post-secondary schools. These new pieces of legislation also recognize the realities of federally-mandated systemic change by setting standards for expectations in the federal legislation, while encouraging local determination of how federal flow-through dollars will be spent to address those standards. Nonetheless, this federal legislation has been viewed as "vocational education legislation," and the reforms to vocational education generally, and to vocational teacher education specifically, associated with these laws have set vocational education apart from the mainstream school restructuring movement.

Policy reforms in education have driven changes in program admission standards, certification and licensure procedures, and induction programs for new teachers. As discussed in earlier chapters of this monograph, these policy reforms carry serious implications for vocational teacher education. Higher education must become a partner in these reforms, for we cannot change the products of schools if we do not change how we teach the teachers. Our institutions must enter the ongoing conversation that currently is redefining the philosophy and definitions of what it means to be "vocational," what the principles are that guide the preparation of vocational teachers, what practical and philosophical knowledge bases and clinical experiences are needed to be an effective vocational teacher, and what the delivery methods of vocational education are in the changing context of work-based learning. Continuous professional development also appears necessary to foster varied and diverse learning opportunities for teachers. Like induction programs for new teachers, professional development activities should be tied to ongoing needs of teachers based on an assessment of performance. As is true in any professional discipline, teachers must accept the responsibility for staying current in their subject matter expertise and teaching skills.

In 1991, the National Education Association (NEA) Special Committee on Vocational Education proposed several reforms, many of which echo similar recommendations made by general teacher education reform, but differ also, due to the historically-unique

relationship between education and work. The Committee encouraged continuous communication between schools and employers about the skills needed for participation in the workplace. The key to vocational education reform, the Committee asserted, is recognition that the various reform initiatives do not address how to implement and sustain proposed changes. For the NEA, these changes must include a reconception of the role of the classroom teacher as an investment in human capital. Echoing one of Goodlad's 19 postulates, the NEA also encouraged the professionalization of teaching.

The State Directors of Vocational Education in conjunction with the University Council of Vocational Education appointed a task force in 1993 to study the need for vocational teacher education reform. After two years of study, the following areas of concern emerged (Task Force on Vocational Technical Teacher Education, 1995): (a) reduction of higher education's capacity to deliver vocational teacher education, (b) increased need for professional development of teachers, (c) increasingly limited fiscal resources in higher education, (d) reduced communication and partnerships between state departments of education and higher education, (e) changing demands on the teaching profession, and (f) changes in the knowledge base for teaching and learning. If these concerns are to be addressed, they recommended that higher education must adopt a commitment toward continuous improvement and provide leadership for vocational teacher education reform. They suggest that collaborative efforts must be developed and enhanced by state departments of education, vocational teacher education, and business and industry. Vocational teacher education faculty are encouraged to incorporate results of research and development efforts into their curriculum. Faculty are challenged to develop benchmarks for quality standards and identify how they will create assessments to measure student achievement (p. 15-22).

As Goodlad pointed out in *A Place Called School* (1984), "justification for vocational education increasingly will depend on the school's success in job training, job placement, and upward mobility of graduates" (p. 15). Schools will have to increasingly think about how to integrate work-based learning into the public school context. We cannot restructure schools, however, without the simultaneous renewal of schooling, vocational teacher education, and traditional teacher education as well.

TEACHER PREPARATION CHALLENGES IN VOCATIONAL EDUCATION

In increasing numbers, the general public seems to be telling colleges and universities that they are wasteful, inefficient, lack accountability, and often pay too much attention to research at the expense of teaching and students. The public also appears to believe that higher education produces too many graduates who are unable to compete successfully in a global marketplace (Carnevale, 1988; SCANS, 1991). This skepticism is also germane to graduates of teacher education programs. The concern expressed is that new teachers exiting our preservice programs will teach students the way they have been taught, perpetuating a cycle of teaching that does not place value on student responsibility for learning, nor on teaching students in contexts in which they relate subject matter to real world experiences.

Overall enrollments in vocational teacher preparation programs have declined. Part of this decline is due to programs being closed by higher education institutions; another source of this decline is the continuing decrease in enrollment in programs. As Lynch (1995) recently stated, "American colleges and universities have significantly diminished their commitment and capacity to produce teachers for America's vocational and technical education systems" (p. 42). Whether or not this diminished capacity and commitment is cause for alarm, however, may depend more on one's philosophy of teacher preparation than it does on politics, economics, and supply-and-demand numbers. For example, in most states, some teachers in selected vocational education areas (i.e., trades and industry and health occupations) can be licensed without a baccalaureate degree. This fact, coupled with pressures in many states for alternative certification processes, will inevitably generate defensible grounds for the elimination of low-enrollment vocational teacher preparation programs. In addition, there is a strong belief held by many professionals across the fields of vocational, special, and general education that specialized teacher preparation programs should be integrated into a single delivery system. The rationale for this belief is strengthened considerably by the mainstreaming and regular education initiative movements in special education, and by the movement emerging in vocational education away from segregated vocational centers back to comprehensive high schools.

If we believe that all students should be educated in common schools and common classrooms, and if we believe that all teachers should have mastery of basic skills, content knowledge in their discipline, an understanding of liberal education, and knowledge of pedagogy, then one has to examine the decline of vocational teacher preparation programs in a different light. Perhaps it is important that vocational teachers be held to the same standards for certification or licensure as their liberal arts counterparts. Perhaps different requirements in different teacher preparation programs have perpetuated the notion of separate and unequal quality in the teaching force. Perhaps the best way to couple academic and vocational curriculum and instruction in the schools is to merge teacher preparation programs in higher education. Table 2 provides a preliminary conception of how such restructured teacher preparation programs might differ from the current norms.

We cannot change schooling if we do not address, consciously and thoughtfully, the preparation of those who teach in the schools. Simultaneous renewal of schooling will require teachers and higher education to work more closely together to enhance teaching effectiveness and to improve student learning. It will also require that all teachers be involved in school restructuring. Achieving these goals will advance the mission of higher education and contribute to the rebuilding of public trust, confidence, and support of teacher education.

If there is concurrence on the need for change, we must decide as a community of vocational teacher educators on the nature and direction of these changes and be willing to set priorities and implement changes within our teacher education programs. Are we modeling good practice? Do we hold our faculty accountable for good teaching? Do we model authentic assessment? Can we identify, as a discipline, what a student should know and be able to do? To move teacher education toward answers to these questions will require better use of university resources, development of quality indicators, establishment of priorities for teacher preparation, and accountability. Equally important, we must agree on the principles that will guide us through the change process as we define what a quality program will look like in the future.

If vocational education is to become an active partner in the overall agenda of school reform, vocational teacher education departments must become active players in this effort. This will

Table 2
Restructured Teacher Preparation

General Teacher Preparation	Vocational Teacher Preparation	Restructured Teacher Preparation
• Pedagogy taught through special methods classes	• Pedagogy taught through special methods classes	• Pedagogy taught through integrated methods classes
• Academic content	• Vocational content	• Integrated content
• No emphasis on work-based learning	• Some emphasis on work-based learning	• Integrated academic and work-based learning
• Limited emphasis on business-industry partnerships	• Some emphasis on selected business-industry partnerships	• Potential for emphasis on full range of partnerships with businesses and industries
• Some clinical experiences in schools; student teaching	• Some clinical experiences in the schools; not always student teaching	• Full range of developmentally sequenced and designed clinical experiences
• Limited range of technological applications	• Limited range of technological applications	• Full range of applied instructional and curricular technology
• General education required	• General education required in some areas	• Coherence of general education curriculum
• Degree required to teach	• Degree required, or alternative certification	• Degree required to teach

require a willingness to put on the table of reform many firmly-held beliefs about our discipline and its relationship to the rest of schooling. For example, the emphasis on subject hierarchies in schools is reflective of the disciplinary structure of higher education with its highly specialized and compartmentalized domains of knowledge and theory (Little, 1992). This discrete subject matter orientation has provided teachers and university educators with a source of professional identity and community, standards for the discipline, and a sense of importance associated with uniqueness of knowledge. State-defined graduation requirements and university admission requirements, too, are often subject-matter oriented. This alignment along subject matter disciplines has perpetuated "turfdoms" and a segregated status quo. Resource allocation, curriculum control and decision-making, and, indeed, the entire

infrastructure is threatened if we question subject-matter stratification.

Finding a way to blur the boundaries between liberal and vocational teacher education may, however, be a mechanism to help restore public confidence in our ability to move in unison with the larger school reform agenda. By broadening our notion of vocational education from the traditional occupational alignments (i.e., trades and industry, health, and agriculture) to a unitary concept of workforce education may be one mechanism to help achieve the softening of boundaries between liberal and vocational teacher education. Workforce education has recently emerged as the broadly defined vision of vocational education. Little (1992) notes, however, that "progress has been predictably uneven. To the extent that vocational educators exemplify this broadened vision .... they stand not only to overcome the lingering stigma attached to 'vocational education' in comprehensive high schools, but also to help shape the future of secondary schooling" (p. 22).

A move to workforce education as the unifying conceptual framework for vocational education will inevitably mean a need to redefine vocational education standards independent of content areas such as agricultural education, health occupations, business education. It will also necessitate the redefinition of the relationship of vocational education with the rest of schooling. As Copa (1992) noted,

> the array of practical problems at hand and anticipated concerns related to the subject matter of vocational education include (a) the relationship of vocational education to the ideal of an educated person, (b) the relationship of vocational education to other curricular categories, (c) the appropriate vocational education for various episodes or phases in the life long process of vocational development, (d) the appropriate vocational education for a wide variety of learners, (e) the social status of vocational education and different kinds of vocational responsibilities, and (f) attributes of being modern and up-to-date in the context of current social and economic changes. A useful conceptual framework for vocational education must prove itself by assisting professionals to resolve these problems. (p. 78)

Just as education has struggled to define itself as a discipline derived from the social sciences and to develop corresponding standards,

vocational education must take on the arduous task of defining standards from a similar unitary conceptual framework.

At the same time reform initiatives have been occurring at the secondary level, there have been increasing demands from policy makers, state boards of education, and in some cases governing boards for higher education, to revisit the reward structure in higher education. The traditional reward structure, particularly for the larger public universities that traditionally house vocational teacher education programs, is based on research. Vocational educators must also begin to show the interrelationship of teaching, research, and service (Boyer, 1990). Institutions of higher education must explicitly state faculty expectations related to teaching, research, and service, and model new paradigms for faculty productivity that are centered on quality in teaching. Faculty, then, will move to place their efforts in the areas in which they receive rewards.

CONCLUDING COMMENTS

Systemic reform of teacher preparation must involve the entire system—starting with recruitment of future teachers and moving through the development of standards and corresponding reforms of curriculum and assessment procedures, professional development of secondary and higher education faculty, teacher licensure processes, and changes to the organization and governance of secondary and higher education. One cannot talk, for example, about the reform of teacher preparation without discussing the reform of the schools. Ideally, they mirror each other—one should not be able to look at one without seeing a reflection of the other.

Teacher preparation programs must focus on the standards that dictate what a teacher knows and is able to do, and those standards must be drawn from and aligned with a coherent philosophic framework of teacher education. At the same time, the reform of vocational teacher education must be reflective of and sensitive to reforms in professional accreditation bodies and the larger reform movement as it exists in the public schools.

What recommendations can be offered to help advance the reform agenda in vocational teacher education? We believe that a reexamination of the issues (presented in Table 1 earlier) with implications for vocational teacher education may offer at least a starting point. For example, one of our first recommendations would

be that any discussion of the reform of vocational teacher education have, as a central feature, a consideration of the reform recommendations contained in Table 1. Clearly these individuals (and reports) have much to offer and have had a sizable influence on the reform of education in this country. The vocational teacher education community can no longer afford to reform itself without grounding the context of these reform efforts solidly in the general school reform movement.

More specifically, Table 1 suggests some other areas for discussion. There is remarkable consistency, for example, in the need for recruitment and admission of individuals of color into teacher education programs. Community colleges have great potential as a rich source of minority students in higher education who might be recruited into four-year vocational teacher education programs. Vocational teacher education may be able to capitalize on the Tech Prep initiative by aggressively converting a 2+2 arrangement to a 2+2+2 articulation plan leading to preservice education programs. Another issue is raising admission standards for entrance into teacher preparation programs. What impact will this have on the pool of prospective vocational teacher education students? How does the awarding of preservice university credit for occupational experience, a common practice in some vocational teacher education programs, interact with elevating admission standards?

In the area of teacher preparation, two common themes are most apparent that have a direct bearing on vocational teacher education: (a) combining all of preservice teacher education in a single unit, and (b) establishing greater collaborative activities between public school and university faculties. With respect to the former, the theoretical/conceptual foundations exist to combine academic (liberal) and vocational education. It is likely that regular education faculty cannot deliver the highest quality teacher preparation programs that are in alignment with professional standards without the cooperation and collaboration of arts and sciences faculty. Similarly, while regular education faculty understand the pedagogical needs of students and practice the constructivist model of integrating content and pedagogical knowledge to increase student learning in context and understanding of subject matter, vocational education faculty have much to offer a visionary concept of teacher preparation, particularly around the importance of understanding the nature of work and family, and the practice of authentic assessment based on

instructional design that aligns theory and practice. Some preservice curricula have been developed to assist in these integrative efforts (Cobb, 1992), but these are only a beginning in what is unarguably a formidable task. Administrative, organizational, and professional issues abound in higher education that mitigate against integrating departments of secondary, special, vocational, and professional education, most notably the deep-rooted tradition of specialized departmental structures. With the information explosion and correspondingly exponential increase in the knowledge base of education, the elimination of specialized departments in the preservice education enterprise becomes more and more difficult. However, the conceptual integrity of integrated teacher preparation programs remains. Perhaps a commitment to a generalist approach to hiring or a commitment to mutual support for collaborative work would help bring integrated content expertise into specialized departments.

With respect to increasing the collaboration between public school and university faculty, partner schools offer the opportunity to get vocational education and vocational teacher educators involved with general education in the restructuring of how we deliver preservice coursework and clinical experiences. Partner schools bring to life for teacher educators the concept of teaching in context–going into the public schools with preservice education courses and working with students and teachers in real life settings. Analogous to the concept of the teaching hospital, faculty teach and research the art and science of teaching in the setting where their students will be employed. This allows clinical experiences to be tied directly to theory, with preservice students being able to try out their new skills in a supervised setting. Students no longer hear about hypothetical problems, but instead, get to practice their application of knowledge based on real problems and situations in the schools. This approach to teacher education allows students to observe a variety of teaching models in real life settings. Successively higher order clinical experiences culminate in student teaching.

The Professional Development/Partnership Schools initiative is an enormously exciting movement, perhaps the first serious breach in the historic isolation between universities and public schools. It is absolutely essential that vocational education join with regular educators and become a more active player in this movement.

In the area of teacher licensure, vocational education has always had alternative forms of certification, often based on hours of occupational experience. In the opinion of the authors of this chapter, this has had a detrimental effect on the overall quality of instruction in secondary vocational education, with an equally detrimental effect on the image of vocational education as a viable and equal option within the secondary curriculum. There is no easy answer, however, to the "right" licensure process. The recommendation to eliminate content majors in education by both the Carnegie and Holmes reports, thus moving the acquisition of content expertise to the content majors, tends to legitimate, at least in theory, the awarding of credit for the acquisition of vocational content expertise in places where it is best found–perhaps in occupational settings, in community college technical programs, or in university colleges of business or agriculture. Similarly, the alternative certification movement has gained momentum across the country, driven by precisely the same rationale as has been used in vocational education. Finally, the national testing movement for licensing teachers, while clearly aimed at the laudable goals of increasing the professionalization of teaching, has drawn serious criticism about the ability of any test to discriminate good teachers from poor ones. What does seem clear, however, is this: If vocational education is to gain equal stature in the schools, both the perception and the reality of its certifying process must be equal to that of other teachers.

Finally, all teacher education programs must expect that the competition for scarce state resources will continue. Vocational teacher education faculty must build partnerships and reduce barriers with general education faculty and begin collaborative relationships with our colleagues in K-12 education. Simultaneous renewal of school and university faculty cannot occur if we are not working together, and working together is likely to be the only way the egalitarian vision of public education can be achieved.

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3

Philosophy: The Conceptual Framework for Designing a System of Teacher Education

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> An excellent plumber is infinitely more admirable than an incompetent philosopher. The society which scorns excellence in plumbing, because plumbing is a humble activity; and tolerates shoddiness in philosophy, because it is an exalted activity, will have neither good plumbing nor good philosophy. Neither its pipes nor its theories will hold water (Gardner, 1961, p. 86).

This chapter focuses on university-based, vocational teacher education as a field of practice. The diversity of theory is discussed, the need for unifying theory is developed, and a coherent philosophy is advocated as a means to ensure that vocational teacher education's practices and theories hold water. A coherent philosophy can be developed for vocational education and vocational teacher education through inductive processes, which result in identifying the philosophic position of these two fields as philosophic pragmatism. Outcomes inherent to the processes of philosophic pragmatism are identified and supported as being critical in formulating the redesign of vocational teacher education. The chapter closes by illustrating the relationship between theory and practice, with cognitive science-based learning theory used as an example of congruence between theory and philosophy.

THEORY, PHILOSOPHY, AND PRACTICE

There seems to be little argument among teacher educators regarding the importance of theory. However, an examination of university-based teacher education programs reveals a diversity of theoretical constructs about learning and teaching, human development, career development, discipline, administration and

leadership, change and the process of change, assessment, and a long list of other topics related to designing, conducting, and assessing educational activity. This is not to declare that diversity is not acceptable. Certainly not all programs need to look alike nor embody all of the same ideas. However, it is important to have congruence between theory and philosophy.

Theory and philosophy are closely intertwined. In part, the diversity of theoretical constructs in education can be related to the level of philosophic development in education. Theory is a statement about how something operates. Philosophy is about how one views the world. Holding a theory that is in conflict with how one views the world represents incongruence. Further, lacking a philosophy promotes the opportunity for holding a variety of theories that lack congruence. Congruence between philosophy and theory is vital in thinking about education.

Practice should be guided by theory. Morris' (1961) ideas about the role of theory in education are as applicable today as they were three decades ago. Morris describes the professional educator as one who is capable of utilizing theory to temper and redirect native impulses. Accordingly, practice becomes more rational and less like the aviator who flies by the seat of his pants. Flying without instruments and electronics does not rule out safe flight any more than a lack of theory rules out the possibility of good teaching. However, the increasing utilization of theory to guide practice is movement to higher ground and greater professionalism. It distinguishes the teaching of a person who has a sound theoretical basis for facilitating learning and an excellent knowledge of subject matter from those who have only an excellent knowledge of subject matter. Those lacking a theory for teaching and learning are most apt to teach as they were taught; whereas, those who possess a theory for teaching and learning have identified appropriate constructs to guide their actions. Good teaching or poor teaching can result in either case, but the probability of improved learning increases when sound theory guides practice.

The Need for a Unifying Theory

Disparate theories abound to guide education practice. The rationale behind selecting one theory over another is often arbitrary and capricious. One theory may be evident in guiding rational

behavior in learning and teaching. An unrelated theory may be evident in practices relating to career counseling. The bases for selecting either theory may be unknown. Moreover, the two theories may present conflicting views about the nature of the learner or being. In our flying example, when the magnetic compass provides one directional reading and the electronic navigational aid provides a different heading, following one or the other will result in different destinations. There is conflict in route and outcomes. Selecting disparate theories represents eclecticism and produces eclectic practice.

Eclecticism, as a theory position, is much like not having any theory. Several different theories provide the foundation for practice. When the various theories are in conflict, the basis for decision making and choosing one theory over another, other than personal choice, is lacking. Further, eclecticism, in deciding theory to guide practice, is not a tranquil road. A rigorous examination of the various theories of the eclectic is likely to reveal inconsistencies and a lack of coherence. Lacking coherence in theory, the eclectic faces conflict and lacks a plausible basis for explaining or reconciling such conflicts. Bigge (1982) identifies the issue by stating, "Although eclecticism has its strengths, its basic weakness is that one dedicated to it has no defensible, systematic basis for knowing when to use discrete aspects of respective positions"(p. 3). The eclectic must be willing to settle for discord, uncertainty, and inconsistency.

Philosophy provides a unifying theory for guiding educational activity. A coherent philosophic position provides the lens through which the vision for a program may be viewed. Additionally, a coherent philosophy becomes the conceptual framework for designing new programs and assessing practice in vocational teacher education. Thus, a coherent philosophy for vocational teacher education–all of teacher education or any type of educational practice–is vital in the design, implementation, assessment, and continued improvement of educational practice. Learning, central to the practices of education itself, is a good example for illustrating the relationship between educational practice and philosophy.

The philosophic view of the nature of the learner communicates ideas about the role of the teacher, philosophically and practically. Together and individually, philosophic views about learner and teacher inform the practitioner regarding learning theory and subsequently the appropriateness of teaching methods. Learning

theory, teaching methods, and philosophic view are highly interrelated.

Philosophy Provides Coherence

Coherence is important in educational practice, theory, and philosophy. Coherence provides a basis for consistency in both practice and thinking. By contrast, eclectic philosophy and eclectic theory lack coherence. Eclectic philosophy is much like not having a philosophy. While some individuals declare that eclecticism is a choice–they want to pick and choose what they consider to be the best among the alternatives–eclecticism is likely to represent a failure to think seriously about the role of philosophy and determine a personal philosophic position to guide educational thinking and practice. For the eclectic, the basis for deciding important issues and which position should be dominant in a given situation is unclear. Attempts to reconcile differing philosophic concepts and create unity will likely result in a philosophic position closely resembling one of the established philosophies (i.e., essentialism, pragmatism, or existentialism). After all, philosophers have struggled for centuries to develop cohesive systems of philosophic thought. A coherent philosophic position strengthens the probabilities for consistently influencing educational practice.

The importance of a coherent philosophic position in teacher education is equally important. Given a goal of redesigning vocational teacher education, it is imperative that individuals seeking to participate in that redesign effort have a coherent philosophic position.

Leadership in vocational teacher education supports this assertion. A research project supported through the University Council for Vocational Education (UCVE) examined the implications of workforce preparation for vocational teacher education. As part of this project, institutional representatives attending the annual UCVE meeting were asked to identify what they considered to be the most important issue facing vocational teacher educators. Through use of the nominal group technique, these leaders identified the eight most important issues. Top rated was the following statement: "Vocational teacher educators need a broad philosophical base position from which reform and restructuring will take place" (N. Frantz, personal communication, September 9, 1994).

In spite of philosophy's significance to the deliberations by UCVE, there are those who would claim that philosophy's influence is overstated. However, the characterization of philosophy as one's view of the world or *weltanschauung* suggests that lacking a systematic view of the world is like wandering around in the dark. Eventually the individual may develop some sense of order and theory about the way things function. Trial and error, however, represent the order of the day; decision making is best characterized as being arbitrary and capricious. A coherent philosophy helps avoid this human condition.

Philosophy and the Educator

Educators frequently claim to have a philosophy. While this may have an element of truth, it is more likely to be what Bassett (1978) has described as a rope of sand. He identifies a rope of sand as a philosophy developed without hard thinking and lacking in organization and consistency. He adds, "Everybody makes philosophical assumptions all the time; but not everybody is conscious of what they are, what their groundwork is, or what they imply in different circumstances" (p. 5). Claiming a philosophy without doing the hard thinking that is intrinsic to a coherent philosophy is to be a philosophic pretender.

Philosophy is about questions–questions centered on the nature of reality, truth, and value. The individual's role is to consider responses to these universally recognized questions. In the educational setting, the educator-philosopher's role is to develop a coherent response to the fundamental questions of philosophy. These questions, given the characterization of philosophy as a way of viewing the world, encompass all that is. (The individual may wish to exempt faith.) Philosophy thus becomes the touchstone for considering questions concerning educational practice. It seems unmistakable, knowing one's philosophy is essential to the redesign of teacher education.

Determining a philosophic position is hard work, whether through an inductive or deductive process–two systematic ways of developing a philosophy. The inductive process for the educator starts with an examination of practices that have proven effective over time. Using this analysis, the next step is evolving responses to the fundamental philosophic questions. By contrast, the deductive process starts with

generalizations regarding the fundamental questions of philosophy. These generalizations are used to guide the development and evaluation of practice. On an individual basis, either process is functional. For a field of practice, the inductive process is more manageable. Moreover, it offers the greatest potential for being representative of a majority of practitioners.

Manageability and representativeness are important issues in developing a philosophy for vocational teacher education. In the deductive process, it would be vital to (a) assemble a large group of vocational teacher educators and (b) have an extended time for dialogue on alternative philosophic positions and endorsing a dominant view for the field. By contrast, the inductive view takes advantage of knowledge concerning successful, preferred practice in the field. That knowledge reflects values held by practitioners and is a general representation of the practitioners' philosophy. Further, the body of contemporary literature representative of such knowledge frequently has undergone a peer review and meets the test of representativeness. Manageability, in the inductive process, occurs through individual efforts to undertake a thorough scholarly examination of the literature. This scholarly process should provide the evidence to make declarations about the philosophic position of the field being examined.

THE INDUCTIVE PROCESS, VOCATIONAL EDUCATION, AND VOCATIONAL TEACHER EDUCATION

Vocational teacher education is a component of vocational education. Just as coherence is sought in a philosophic position, there should be coherence in the elements that make up a field of practice. It seems rational to believe that the philosophic position of vocational education and vocational teacher education should be congruous. Specifically, the philosophic view of programs that prepare teachers for a field of practice, vocational education in this case, ought to be the same as that field of practice. It is from that assertion that the process of philosophic development can begin.

The principles of vocational education provide a resource for examining the contemporary, preferred practices of the field. Consistent with this assertion, principles of vocational education are defined as "generalizations that state a preferred practice and serve

as guidelines for program and curriculum building, evaluation, selection of instructional practices, and policy development" (Miller, 1985, p. 5). In this instance, they become the avenue for inductively developing a philosophy for vocational education and vocational teacher education.

Miller (1985) provides an analysis of currently preferred practices that leads to the development of principles for vocational education. This analysis is based on the literature of the field that largely reflects what vocational educators have to say and claim about vocational education. While these principles are of great value and reflect successful practice in vocational education, they are not a substitute for philosophy. However, these very principles make possible the development of a philosophic identity for vocational education. By using these principles to consider responses to the fundamental questions of philosophy, it is possible to inductively derive a philosophic position of the field.

Through this inductive process, it is reasonable to declare that the philosophic position of vocational education is pragmatism. Pragmatism incorporates the educational progressivist, reconstructionist, and the experimentalist. Some may argue the accuracy of this inclusiveness, but the differences are peripheral to the purposes of this chapter. Pragmatism or pragmatist is used as a generic reference to these areas. The assumptions of pragmatism correspond with the nature of practice in vocational education. The practices of vocational education (its principles taken in unity) represent coherency, harmony, and internal consistency, while avoiding self-contradiction. These same terms accurately describe the philosophy of vocational education. It is a harmonious whole that emerges with coherency and unity. In keeping with the declaration earlier in this section, the philosophic position of vocational teacher education is also represented by pragmatism.

Philosophy and Education's Philosophical Questions

Describing philosophy as a way of viewing the world places any educational issue within that view. The same is true for any other question, issue, topic, problem, or idea related to the human condition. Regardless of the area of concern, philosophy is about questions concerning the nature of reality, truth, and value. This all-encompassing nature of philosophy indicates those philosophical questions in education parallel the questions of philosophy. In

essence, any theme in education generally falls under one of the three philosophic concerns–reality, truth, or value.

In education, the philosophic nature of being or learning is a reality question. Similarly, philosophic views on the role of the teacher are connected to a view of reality. Philosophic ideas about knowledge and subject matter issues parallel truth issues in philosophy. Philosophic concerns about purposes of schooling are based in the value issues of philosophy. Responses to ideas about learner, teacher's role, the basis for knowing and knowledge, and purposes of schooling constitute the framework for philosophic thought in education just as responses to questions and issues about the nature of reality, truth, and value are the framework for philosophy. Moreover, philosophical ideas about reality, truth, and value provide the foundation for congruence of philosophy with philosophic thinking and practice in education.

Pragmatic Philosophy in Education

To the pragmatist, reality is verb-like. The world is in process, and reality equates to experience in ordinary life. Thus, reality tomorrow will differ from the reality experienced today. The learner changes just as the world changes. Furthermore, the learner is a transactional being, one who transacts business with the world. Each transactional event is the basis for a reconstruction of experience–the creation of meaning and a change in the individual. Learner as a being is always in process and becoming.

Teachers are the educational enterprise's most important representative. Teacher is also a being, and the view of learner has strong implications for the roles and acts of teachers. In pragmatism, claims about the nature of learner as a being are equally applicable to teacher. Each has a set of experiences that is unique to the individual. The teacher, while engaged in the teaching role, is also experiencing, reconstructing experience, creating meaning, changing, and becoming.

Pragmatic teaching mirrors the nature of the learner. The emphasis is on learning by doing–experiencing. The teacher's role is to provide experiences building on the learner's prior experiences. Teacher is a director of learning who serves as a facilitator. Learning becomes achievable through problem solving, collaborative learning activities, and use of techniques that reveal the open-ended and

changing nature of reality. In this perspective, learning is a lifelong activity, and the pragmatist emphasizes the continuity of learning rather than acquisition of facts. Teacher's learning, like learner's, is lifelong.

Truth is central to the business of education–it is the educator's stock-in-trade. Further, the philosophic nature of truth has a coherent relationship to reality. For the pragmatist, truth is tentative and subject to change just as is reality. It is open-ended and ongoing, subject to error, and in need of continuous assessment. The verification of truth is through human experience and not thought of as *a priori*. Truth can be described as warrantable assertions held open to public view. Ultimately, the workability of truth and its acceptance by the public represents its confirmation.

Curriculum reflects truth. The selection of specific truths to be included in any educational program is a value decision; regardless, the stuff that makes up curriculum is truth. Whatever philosophical processes apply to the verification of truth hold true for curriculum. Pragmatic curriculum's verification takes place through human experiences rather than being *a priori*. Pragmatic curriculum belongs to the public and workability is a measure of its reliability. The descriptors of the nature of truth are also the descriptors of the nature of curriculum. Pragmatic curriculum is tentative, subject to change, open-ended, and in need of continuous assessment.

Values and value choices are crucial to philosophic processes. The decision to choose one philosophic view over another or to subscribe to an eclectic position is a value choice. Whether based on inductive or deductive methods, the ultimate decision regarding a philosophical position is pivotal for other decisions regarding philosophy. The momentous nature of value decisions is difficult to overstate.

Values for the pragmatist are subject to change just as are reality and truth. Determining pragmatic values is much like determining pragmatic truth. The process is democratic, open, and public. Values guiding societal mores and choices are certain to change over time. Change, however, is achieved through community working together in settling on those values that are to guide present and future action.

The purposes of schooling are value choices. For the pragmatist, schools are links to contemporary social structures. As such, the business of day-to-day living is as much a part of schooling as the

individual is a part of society. Schools, society, and person are inseparable. Each influences the other, yet it is person and people as community that create change.

Change is a key idea for the pragmatist. Truth and knowledge are not set, and preparation for being adaptable to change together with determining the direction of change is a primary function of schooling. Examining open questions, applying problem-solving techniques, and trafficking in the daily affairs of society are ways of facing the reality and certainty of change.

Experience is also important in schooling for the pragmatist. Furthermore, the pragmatist recognizes the importance of the individual's prior experience as a critical part of the process of learning and becoming. The school's responsibility is to build upon those experiences, to provide opportunities for further experience, and to facilitate the creation of meaning.

Education to the pragmatist is a lifelong journey. The tentative nature of truth and value, the process of experiencing, and the reconstruction of experience creates a need for being a lifelong learner. Perhaps no single role of the school is as strategic to the purposes of schooling. Schooling can be thought of as a public duty and a means of socialization. Additionally, the pragmatist conceives schooling as an example of democratic existence. However, being instrumental in inducting the individual as a lifelong learner is of great consequence.

Change, experience, and lifelong learning are among the themes of pragmatic philosophy. Pragmatism, like other philosophic views, has themes that mirror philosophic values–values inherent to that philosophic view. Moreover, these deep-seated values are appropriately translated as purposes of schooling.

Pragmatic Learner Outcomes

For the pragmatist, the purposes of schooling would reflect the key tenets of pragmatism. These values would result in schools that would provide opportunities for learners to develop capacities as

- problem solvers
- collaborators
- makers of meaning
- lifelong learners
- change agents
- practitioners of democratic processes

These are the capabilities that pragmatism requires to function, and these are among the purposes that would dominate educational practice in any educational activity or program based on philosophic pragmatism. Together they represent the measure against which such educational activity would be placed. If an activity did not contribute to one or more of these outcomes, that lack of contribution would be the basis for questioning the value of the activity itself and probably its elimination.

As problem solvers, learners would see problems as a stimulus, encouraging mental activity, creating opportunities for new experience that, in turn, lead to the reconstruction of experience and creation of meaning. Learners would be adept in the workplace requiring the development of solutions to emerging and recurring problems. Self-directed learning would be among the orders of the day. The learner-worker would be able to use information systems as a resource to think both critically and divergently about alternate solutions and to test or experiment with such alternatives in proposing a tentative solution or solutions.

As collaborators, learners would be able to communicate and work constructively with others to solve problems, participate in the process of pragmatic truth verification, and share experiences as makers of meaning. Such learners become able participants in a workplace providing an environment fostering work-team decision making and participation in management decisions.

As makers of meaning, learners would be able to engage in systems thinking, as well as reflective thinking, about new experience in constructing meaning through the reconstruction of old experiences. Such learners would carry forward these skills in the workplace, providing new ideas and alternate approaches to problems of improving quality and productivity as a part of a global economic system. Technology would be a license for productivity and creativity.

As lifelong learners, individuals would be able to understand the processes of learning and the need to be a learner for a lifetime. Additionally, learners would be aware of their personal learning style and choose learning strategies in keeping with that style. To reflect lifelong learning, schools would need to change. A desirable restructuring would make schools places for the work of lifelong learning based on the needs of the individual learner. Teachers and administrators would abandon the scientific management model now used in schools, which reflects an outdated industrial system that is inappropriate to the design of the emerging workplace.

Adaptability to change and being an advocate of change is consistent with the nature of reality, truth, and value. Pragmatically developed learners would be agents for change who demonstrate flexibility and acceptance of the certainty of change. Moreover, such learners demonstrate the capability to provide leadership as proactive change agents in preparing for the future they envision. It is possible to declare with great certainty that the future will be different from what exists today.

As practitioners of the democratic process, learners would embrace a democratic classroom. They would be full participants in the processes of pragmatic philosophy. Democratic processes guide collaborative activity and are also the basis for public involvement in the verification of truth. It is through democratic processes that our society determines the purposes of schooling–what it is that we "ought to ought"–and in solving the issues that confront people in the workplace and throughout society. Diversity and an emphasis on equality of all learners would be celebrated. The pragmatic learner described above represents a mainstay for the democratic workplace of the future with its expectations that individuals engage in problem solving, collaboration, creativity, lifelong learning, adaptability, and innovation.

Teacher Education and Pragmatism

Declarations made about education based on philosophic pragmatism apply regardless of level. As stated earlier, vocational teacher education is a component of vocational education. Just as coherence is sought in a philosophic position, there should be coherence in the elements that make up a field of practice. It seems rational to believe that the philosophic position of vocational education and vocational teacher education are congruous. Philosophic outcomes for vocational teacher education are thus congruent with philosophic outcomes for vocational education.

The philosophic outcomes above represent values inherent in the philosophic framework of vocational education. That framework resulted from an inductive synthesis of the principles of vocational education. In turn, the principles represent an analysis of the writings of vocational educators concerning successful and preferred practices for the field. In an inductive approach, preferred, successful practices are the source of principles. Principles provide the basis for deriving the philosophic view of the field of practice, and philosophy

Figure 1. A Systemic, Philosophic View of Teacher Education.

and its inherent outcomes is the coherent framework for evaluating each element of the field of practice. A systemic view of this process and its products is shown in Figure 1.

Redesigning vocational teacher education, utilizing this systemic view, can begin with a philosophic framework in place. Having a philosophic view provides a unifying theory for guiding educational activity. A coherent philosophic position provides the lens through which the vision for vocational teacher should be viewed. Further, it is the means for evaluating concepts and proposals under consideration. The measuring stick relates to the three fundamental questions of philosophy about reality, truth, and value. In education, including vocational teacher education, those questions focus on learner and teacher as being, curriculum as truth, and purposes of

schooling as value choices. In the latter case, specific purposes are inherent to the philosophic position.

Principles proposed to guide the redesign of teacher education must be evaluated for congruence with the philosophic position held and its inherent purposes. Throughout this book, specific proposals impacting on the redesign of teacher education are offered. Additionally, individual practitioners will develop models and modify programs as a part of this process. In every instance, these ideas should be examined by the same standard. Are they congruent with philosophic pragmatism and do they offer the potential to contribute to one or more of the philosophic outcomes inherent in philosophic pragmatism? At the same time, the democratic methodology inherent in pragmatism should be highly evident.

Pragmatic philosophy provides a coherent framework for the redesign of vocational teacher education. Additionally, a coherence of principles with philosophy is a requisite in reconstructing vocational teacher education carrying out the collective vision of model builders for the future.

Identifying philosophic pragmatism as the basis for redesigning vocational teacher education is proactive. It recognizes the changing nature of reality, truth, and value. Moreover, it is a call for change. The point of view is reconstructionist (Gregson, 1994; Lakes, 1994), advocating a critical examination of present vocational teacher education and movement to higher ground.

Naisbitt's *Global Paradox* (1994) serves to describe the relationship of philosophy and vocational teacher preparation as a part of the process of preparing tomorrow's workforce. Naisbitt's claim is, "The larger the economy, the more powerful its smallest players" (p. 5). If one considers preparation of tomorrow's workforce and workplace education as becoming larger and larger, it seems appropriate to describe the role of the smallest players as becoming more powerful. In the past, teacher education and philosophy have certainly been among the smallest players. To recognize their individual importance in preparing tomorrow's workforce would be to also recognize their growing power and importance in workplace education. Philosophic development is critical to that process.

Individual philosophic development is central to the movement seeking higher ground in preparing tomorrow's workforce. Careful consideration of one's personal philosophic view is a part of that critical examination. Whether the individual's views are essentialistic,

pragmatic, or existentialistic, it is important to determine how those views fit within the context of the philosophic view of the field. For the pragmatist, the goodness of fit is obvious. For the essentialist and the existentialist, finding coherence with the views of vocational education is more difficult. Still more difficult is the task of any who wish to remain eclectic. Reconciliation may be nearly impossible. Again, it is essential that the individual practitioner have a well articulated and coherent philosophy for determining how one is to conduct educational activity in a manner consistent with the field of vocational education.

PHILOSOPHY TO PRACTICE

The critical nature of philosophy is to influence educational thinking and practice. In short, practice should be guided by theory. Similarly, practice in vocational teacher education should reflect the field's philosophic position and principles that are congruent with the philosophy. More specifically, the principles found later in this monograph deal with practice and set a pattern for thinking about educational practice in vocational teacher education. Four of these principles address learning and teaching methodology and serve as good examples for illustrating relationships between philosophy and educational practice. This is true not only because learning is sought as an outcome in education–it is a point of convergence for philosophy and practice. Developing a learning theory congruent with the philosophic position held is just as significant as coherent philosophic thinking itself.

Pragmatic philosophy and learning theory reflective of the cognitive sciences represent such congruence. Pragmatism is a social process philosophy. It simply does not function without social processes. The inherent values or educational outcomes listed above, together with pragmatism's means for the verification of truth and values, illustrate the social nature of pragmatism.

Cognition also has social foundations (Levine, Resnick, & Higgings, 1993). Levine, Resnick, and Higgings hold a fundamental view of cognition as a social activity. The areas of social activity forming a basis for cognition are diverse (i.e., comparisons with others, anticipated interactions with others, conflict, majority and minority influences, and collaboration). It is their position ". . . that

all mental activity–from perceptual recognition to memory to problem solving–involves either representation of other people or the use of artifacts and cultural forms that have a social history" (p. 604). They go on to point out several teaching methods based on social relationships that enhance learning and performance, including peer tutoring, cooperative learning, use of structured procedures with students asking questions and providing explanation in small-group settings, and learning apprenticeships.

Cognitive science is itself a unifying field of activity. It represents studies in the disciplines of psychology, anthropology, philosophy, computer science, and the neurosciences (Hunt, 1989). Glaser and Bassok (1989) point out that cognitive theory psychology has made significant advances in problem solving tasks and subsequently the study of learning. Furthermore, cognitive science research has helped influence a major educational shift from behaviorism to constructivism as a view of learning (Johnson & Thomas, 1992). Mayer (1993) suggests that cognitive interests have had a unifying force in psychology. He cites past educational psychology as being eclectic and atheoretical as compared to the present condition of greater unification that he attributes to the cognitive movement.

The philosophic view of being as a maker of meaning is consistent with cognitive science's view of learning. Shuell (1986) emphasizes the importance of prior knowledge in the acquisition of new knowledge. Cognitive conceptions of learning, according to Shuell, give great credence to the role of prior knowledge in acquiring new knowledge. Quality performance and developing complex knowledge seem to involve a qualitative restructuring and modification of patterns held by the learner (Glaser & Bassok, 1989). In describing learning that mirrors the view of the cognitive sciences, Thomas, Johnson, and Anderson (1992) describe knowledge as being individually constructed through interactions with the world and other beings.

Cognitive approaches to learning emphasize the active nature of learning. Accordingly, learning is a constructive and goal-oriented process dependent on the mental activities of the learner (Shuell, 1986). These approaches are consistent with the philosophic view of the learner in pragmatism.

Problem solving is at the heart of cognition for the cognitive scientist (Glaser & Bassok, 1989). The corresponding theoretical framework of learning holds that effective knowledge can be acquired only through solving problems. Derry (1988) holds that learning

represents a form of problem solving and effective learning involves devising an approach appropriate for that problem. She goes on to observe that usable rather than inert knowledge should be the goal of learning. Shuell (1986) supports this view by indicating that most cognitive ideas about learning represent great concern for complex learning or the "types of learning frequently characterized as 'meaningful' or where one 'learns for understanding'" (p. 43).

Learning and learning theory serve as only one example of the importance for coherence between practice and philosophy. Because the purpose of this chapter is to develop the role of philosophy in redesigning teacher education, the use of learning and learning theory as an example of that coherence has led to a brevity which understates the significance of cognitive learning theory and its coherence with pragmatic philosophy. At the same time, it underscores the importance for vocational teacher educators to collaboratively develop an expanded statement of cognitive learning theory as a contribution to further unification of philosophy, theory, and practice.

CONCLUDING COMMENTS

By way of reflection, it is clear that philosophy has a strategic role in the development of a coherent framework for thinking about the redesign of teacher education. *Coherent* is also the operative term in judging the quality of the philosophic thinking. A lack of coherence in philosophy itself is damning to philosophic processes and precludes an eclectic approach to developing a philosophic position for vocational education and thus vocational teacher education.

An inductive examination of the fundamental principles of vocational education provides a clear picture that philosophic pragmatism is the philosophy that undergirds the field of practice. Philosophic pragmatism, therefore, provides the conceptual framework for designing or redesigning a system of vocational teacher education.

Philosophic pragmatism's inherent outcomes, outcomes that are central to the processes of pragmatism, translate to purposes of education based on the philosophic view. Accordingly, an educational system based on philosophic pragmatism would result in learners who are problem solvers, lifelong learners, makers of meaning,

collaborators, change agents who are also able to change, and practitioners of democratic processes. Education based on this philosophy should be measured against these outcomes. Under this environment, practice would reflect a coherent philosophic framework suitable to guide teacher education theory and practice in the preparation of individuals for the workforce of the future.

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4

Principles of Vocational and Technical Teacher Education

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Ten principles serve as the foundation upon which programs, curricula, clinical experiences, standards, measures, and practices that assure high quality vocational and technical teacher education may be based. The principles are grounded in pragmatic philosophy. They were developed from the extant literature on reform in vocational and technical education and in teacher education and address faculty, programs, and institutional commitment.

BACKGROUND

During the past 20 years, improved research and research methodology have significantly increased knowledge bases for teaching and teacher education. Considerable research has informed the teaching profession about learning, motivation, child and adolescent behavior, cognition, adult pedagogy (or andragogy), and leadership and management in complex public education and other learning environments.

Professional education knowledge bases and thus teachers' facility to diagnose learning styles, proscribe instruction, and authentically assess student performance have increased dramatically. This increased understanding of human development, learning, and effective teaching is being translated reasonably well into instruction in many classrooms throughout the country and in progressive programs of teacher education. Research linking instructor behavior to student achievement has contributed enormously to understanding of the important, but often complex, instructor-student relationship. Further, this and other research emanating from the cognitive sciences have been used as a basis to create systems of accreditation and certification. Examples include tougher standards for the accreditation of professional schools of education by the National Council for Accreditation of Teacher

Education (NCATE), the certification framework and programs developed by the National Board for Professional Teaching Standards (NBPTS), and the model standards for beginning teacher licensing from the Interstate New Teacher Assessment and Support Consortium (INTASC).

Research and accreditation efforts have formed the foundation for making education a more respected profession. This means establishing requirements for entry and training into the field; defining the nature of the work, structure of the jobs, and the authority that governs it; developing and monitoring accountability measures (i.e., through accreditation); enforcing a code of ethics, with special concern for clients; identifying knowledge bases and related responsibilities that must be mastered by those who are to practice the profession; and preparing practitioners to exercise a high degree of autonomy–all based on interpretive and applicative knowledge. Standards, criteria for measurement, and assessment are often established for each component of the professional framework (Darling-Hammond & Goodwin, 1993).

Within education, there are professional subject-matter specializations such as English, mathematics, science, and elementary education. There are also role specializations such as school administrators, counselors, technology specialists, and vocational education directors. Increasingly, the various components of a profession are being developed into standards and related measures of performance to help guide and assess preparation and continuing education programs for many of the subject matter and role specializations (Wise, 1994).

This chapter is an attempt to begin to do likewise for the specialized subject area of vocational and technical education. The primary assumption of the chapter is that vocational and technical education must conduct itself as a profession and give increased attention to the special components that collectively depict a profession. Special priority must be given to historic and contemporary research on teaching and learning, wisdom of practitioners, creative vision of educational leaders, and further developments from and knowledge needed for 21st century workplaces.

The chapter sets forth ten principles for guiding vocational and technical education professionals in further development of a philosophic and conceptual framework for teacher education, performance-based standards, effective practices, and criteria by

which to assess, accredit, license, and certify programs, students, graduates, and faculty in vocational and technical teacher education.

The principles are grounded in the philosophic tenets of pragmatism (see Chapter 3); they are undergirded in such pragmatic themes as change and recognition that the world changes, experience and the constant need for students and teachers to make sense out of their experiences, and lifelong learning. Thus schools, teachers, and, by implication, college faculty provide opportunities for themselves and their students to become problem solvers, collaborators, makers of meaning, lifelong learners, change agents, and practitioners of democratic processes.

The principles are considered to be the essential origin of practice. A principle is a fundamental truth, law, or rule upon which standards are to be developed and evaluated and practices and future actions are encouraged. Principles are necessarily general, but they serve as guidelines for more specific policy development, program and curriculum building, selection of instructional practices, and evaluation.

The principles have been developed based on several assumptions:

1. Programs to prepare vocational and technical teachers and related education personnel (e.g., secondary and postsecondary school administrators, vocational directors, career counselors, supervisors) must change. But those changes must be based on solid philosophic and visionary foundations, research, wisdom of effective practitioners, and knowledge bases from both education and workplace arenas.
2. There is a knowledge base that must undergird the preparation of *all* vocational and technical education teachers, regardless of their occupational specialization. However, this knowledge base (see Chapter 1) may not have been researched, debated, codified, or classified satisfactorily. This chapter and others in this monograph are provided as a reasonable starting point.
3. Closely related, epistemology–the theory of knowledge–for vocational and technical education has probably not been addressed or debated adequately by the profession. Researchers, teachers, and others must continue to give attention to that which they know and how they have come to know it. Epistemology is a branch of philosophy concerned with the nature and scope of knowledge, its presuppositions

and bases, and the general reliability of the claims to knowledge. It includes examining universals, causation, empiricism, intuition, reasoning, data, claims, and extrapolations (Fenstermacher, 1994). This and other chapters in this monograph provide a contemporary opportunity for the vocational and technical education profession to debate its epistemology.

4. Change or reform in vocational and technical teacher education must be concomitant with reform in other subject area specializations and with education reform and renewal in general. Changes cannot be conducted in isolation on college or university campuses or in school systems; changes must be integral to the overall reform of public education.
5. The vocabulary used herein–particularly the terms *vocational and technical education* and *vocational and technical teacher education*–is meant to encompass other appellations (i.e., *workforce education, workforce development, workplace education, work and family life education, technical education, vocational education and then the corollary teacher education associated with each*).

Methods Used to Determine Principles

The extant literature on reform in vocational and technical education and teacher education and discussions among vocational and technical teacher education faculty were primary methods used to determine the principles presented in this chapter. The principles are grounded in research, publications, and reform efforts that have tended to mold and shape changes in teacher education at many colleges and universities during the past decade or so.

The principles are perhaps most heavily influenced by the work of The Holmes Group (1986), the report of the Carnegie Task Force on Teaching as a Profession (Carnegie Forum on Education and the Economy, 1986), John Goodlad (1990) and his work at the Center for Educational Renewal at the University of Washington, the standards developed by NCATE (1994), the report of the Presidents' Commission on Teacher Education (1992), publications from the American Association of Colleges of Teacher Education and the Association of Teacher Educators (1995), the vision of excellent teaching–especially in vocational education (early adolescent/young adulthood)–and the

five core propositions from the National Board for Professional Teaching Standards (1991), and the model standards for beginning teacher licensing and development from INTASC (1992). Further, the literature that has posited reform in vocational and technical education and/or focused on education needed by youth and adults who are in need of initial and continuing education and training to perform successfully in contemporary workplaces has also informed the development of the principles.

Faculty and heads of college and university vocational and technical education units became involved in a discussion of *proposed* principles beginning in 1993 and continuing through 1994. This effort was spearheaded primarily by the University Council for Vocational Education and its subcommittee on teacher education. The latter met several times and facilitated discussion among faculty at colleges and universities, two e-mail discussions about vocational and technical teacher education and the related development of principles, and oral and written discussions among task force members and faculty at various meetings.

Principles are presented separately in the next section together with rationales that further describe and enrich understanding of the principles in practical settings. Much of the description is perhaps idealistic and far afield from prevailing practice in many college and university environments; nevertheless, the principles and the related narrative are provided to serve as bases for developing programs, curriculum, and practices to enhance high quality teacher education.

TEN PRINCIPLES OF VOCATIONAL AND TECHNICAL TEACHER EDUCATION

Vocational and Technical Teacher Education Faculty

Principle #1. Faculty are committed to their students and to students' professional development as lifelong learners. Faculty who prepare vocational and technical education teachers do so in a variety of environments: college and university classrooms, distance learning, staff development seminars and workshops, short- and long-term inservice education, school- and work-based settings,

computer-assisted instruction, and one-on-one consultation. Regardless of environment or location, the central focus of teacher education faculty work is commitment to their students' learning and development as professional educators.

This commitment is demonstrated in many ways: incorporating the prevailing theories of cognition and pedagogy in college faculty practices; assuring that all students learn what they must to become successful educators; analyzing teacher education students' needs for learning and the profession's needs for education, and then proscribing curriculum and practice accordingly; using authentic evaluation throughout the periods of learning; and connecting theory with practice.

Teacher education faculty recognize that learning to teach is a lifelong endeavor. It takes years of effective schooling, practice, tutelage, and reflection. Inservice training and graduate education are the norm for practicing teachers throughout their professional lives. Universities, state departments of education and local school systems, and community and technical colleges provide for continuous education of professional educators. These continuing education programs are well grounded in a solid theory and research base, contribute to a learning culture, include a coherent sequence of activities aimed at achieving a broad vision of educational improvement, allow for adequate time and resources, include active learning components, connect with practice, are evaluated, include follow-up and follow-through, and are based on a model of continuous inquiry and problem solving (Fullan & Steigelbauer, 1991; Joyce & Showers, 1988; U.S. Department of Education, 1995).

Teacher education faculty and others actively involved in the continuing professional development of teachers are themselves lifelong learners. It is evident in their professional lives and obvious in their work. Their practice demonstrates contemporary knowledge and practice, use of the extant literature and research, illustrations from the current wisdom of teachers, and involvement in a wide arena of education reform. The faculty themselves are professionally trained and skilled as teachers. They are knowledgeable about current practices in work and education environments, exhibit intellectual vitality, participate in professional associations, and engage in their own professional development activities (Association of Teacher Educators, 1995; National Council for Accreditation of Teacher Education [NCATE], 1994).

Principle #2. Faculty use curriculum and instructional techniques to integrate theory with practice, academic and workforce education, professional education and subject matter, and learning theory and workforce preparation. Vocational and technical teacher education faculty recognize that their students' learning must be the utmost priority. What must students know and be able to do to be effective as professional educators?

Contemporary literature and research indicate that vocational and technical education teachers must have a solid grounding in (a) workforce education (common and specialized subject matter and workforce preparation processes); (b) general education and the liberal arts; and (c) knowledge of the learner, pedagogy, instructional technology, and professional education (see Chapter 1). These various pairings are connected. The theories and research that underlay them as separate entities and as partners must be connected to the real world of practice in schools, community colleges, and other educational environments and workplaces. When done so effectively, powerful manifestations of learning are demonstrated.

Faculty teach relevant theories and demonstrate effective practices in their own instruction. They possess knowledge of contemporary research related to curriculum integration and holistic, contextual learning. Equally important, they demonstrate this knowledge through their own instruction. Teacher educators are thus replacing conventional teacher-centered didactic instruction with more activity-oriented, situated, student-centered methods. Faculty are engaging their students in activities that encourage student initiative, inquiry, and explanation of important concepts in vocational and technical education and that link their schooling experience with their lives in the world of professional practice.

Faculty, too, regularly reflect on the effectiveness and quality of their own and their students' instruction and related practices. They are continually extending their knowledge, perfecting their techniques, and refining their own philosophy of education. They engage in reflective practice with their students and use the resulting analyses to identify needs for additional study, experimentation, and revised practice (Association of Teacher Educators, 1995). Faculty also endeavor to develop their students' ability to think critically and creatively, solve complex human- and work-related problems, integrate academic and applied subject matter, communicate effectively, and operate within a personal and professional code of ethics.

Principle #3. Faculty understand the philosophy, contemporary concepts, research, effective practice, and methods of inquiry related to workforce preparation and development. Faculty draw on the history of vocational and technical education, various philosophies, contemporary knowledge bases, and future scenarios to articulate and teach a position on workforce preparation. They are concerned that their students understand well the history of workforce preparation programs—including their sociological, economic, political, and educational contexts—as well as the contemporary bases and envisioned future for educational programs that will focus on workforce preparation.

Faculty recognize that workforce preparation programs are not and cannot be static. Programs will continue to evolve and change with technology, increased knowledge, new practices in the workplace, consumer demand for different products and services, and increased globalization and diversity in the workplace and among the workforce.

Therefore, faculty are active researchers, inquiring into the nature of work and education, generating new knowledge and validating old, and bringing results to theory and practice. To do so, they use appropriate methods of research, analyze findings and draw conclusions for practice and further tests of theory, and disseminate results to enhance preparation of professional educators.

Faculty use collaborative inquiry models with their students that require them (students and professors) to seek, use, and evaluate methods that work in the real world of practice. Students are constantly encouraged to draw on theoretical frameworks and research and test their applications in schools and workplaces. Faculty engage in collaborative, action research with their students and co-workers in both education and workplace environments.

Principle #4. Faculty use dynamic pedagogy, based on learning theory and practices appropriate for youth and adults. This speaks further to the practice of teacher education. Faculty–whether on college campuses, in school environments, through distance learning, or in workshop settings–model solid pedagogy to their students. They know how students learn and how they should be taught at various ages and stages. They especially know how adult students learn and they know how to teach these adult teachers to teach. They use content and experiences congruent with adult learning theory and practices.

Teacher education faculty, therefore, help students to integrate new learning with existing knowledge and experiences, provide maximum opportunity for students to practice new knowledge or skills, provide supportive learning environments, use feedback and formative evaluation to facilitate learning, use positive reinforcements, eliminate superfluous information but reinforce theory development, use various sensory stimulations, and engage students in establishing some of their own goals for learning as well as evaluation and timelines (Joyce & Showers, 1988).

Principle #5. Faculty are partners in learning communities through which they model collaboration and democratic processes for their students. The work of teacher education extends far beyond classrooms in a college education building or a staff development room in a school administration building. Faculty are constantly collaborating with others to develop well the skills of their students, to enhance the profession of education in general and vocational and technical education in particular, and to improve the teacher education profession (Association of Teacher Educators, 1995).

Vocational and technical teacher educators are proactive and creative in working with others to enhance the preparation of all teachers to help all students prepare for work. Faculty collaborate with their colleagues in other units at colleges and universities, in state agencies, school environments, and policy arenas to develop appropriate policies and curriculum for students (e. g., in admission and retention, academic preparation, professional studies, clinical experiences, certification and licensure, and related services).

Vocational and technical teacher educators are also advocates and partners with others interested in appropriate education policies and practices. They collaborate to establish broad goals for education, identify priorities for public schooling, research tough questions and practices, inform policy makers and the public of findings and conclusions, advocate appropriate learning decisions for all youth and adults, and respond professionally to the public's appropriate interests and concerns about education. They also actively address policy issues that affect the profession of teacher education.

Faculty team with colleagues in public schools, technical institutes, community colleges, businesses and industries, professional associations, youth organizations, and *second chance* schools (prisons, juvenile detention centers, drop-out recovery

programs) to prepare their students adequately for roles as professional educators. They are especially skilled at establishing school- and work-based learning experiences with and for their students. Faculty inform their students of other segments of the community (i.e., social services, technology centers, libraries, specialized agencies) that can collaborate to deliver appropriate educational goals.

Vocational and Technical Teacher Education Programs

Principle #6. Programs are dynamic and change oriented. Programs to prepare vocational and technical education teachers are carefully designed to meet their learning needs as they begin and advance in their profession. Program designs are reflective of current literature and research that describe contemporary and future workplaces, educational environments, technology, teaching and learning processes, and the related education that is needed to prepare teachers to teach others to negotiate successfully in contemporary and future workplaces.

Programs are always in relative flux, constantly changing to reflect new knowledge and improvements in high performance workplaces and in high performance schools. Programs are never static. Rather, they are often on the cutting edge in colleges and universities with evidence of advanced theories, improved technology, and innovative learning experiences to reflect the best of workplace and education practices. Potent, forward-looking vocational and technical teacher education programs reflect rapid changes that occur as the economy shifts from agriculture and manufacturing to information and technology and as schools change from passive, abstract learning to active, contextual learning.

Colleges and universities recognize that academic units in vocational and technical education are, of necessity, in relative flux and rapid change. Academic administrators are therefore flexible in addressing needs for curriculum reform and expedite processes to assure timely, high quality changes in programs, courses, content, and delivery.

Principle #7. Programs are grounded in academic education, workplace subject matter, workplace processes, technology,

professional education and pedagogy, and clinical experiences. The essence of any program is curriculum–that which teacher education students are taught and that which they are expected to demonstrate has been learned. The essence of college degrees is that graduates (in this case, vocational and technical education teachers) have solid academic backgrounds and possess literacy and critical thinking abilities associated with educated citizens. Therefore, vocational and technical teacher education programs are well grounded in the social and behavioral sciences; humanities, literature, and the fine arts; languages, including communications principles and applications; mathematics and statistics; the natural sciences; and technology. Academic and liberal arts components of the curriculum are well planned with faculty in appropriate units in arts and sciences and reflect applied contexts needed by vocational and technical education teachers. These contexts may include instruction and practice in the processes related to both contemporary workplaces and educational environments.

Workplace subject matter is extracted from the knowledge, skills, and dispositions needed to enter and advance successfully in a particularly industry or a broad occupational cluster. College curricula are designed to prepare prospective and practicing teachers in the subjects typically taught in vocational and technical education programs in middle school, high school, postsecondary, and adult education environments. Workplace subject matter may be acquired through credit course work, university-supervised workplace experiences (such as apprenticeships or clinical internships), occupational licensing, credentialing through prior relevant work experiences, or some combination. Subject matter includes depth and breadth in a particular industry or occupation, including planning, management, finance, technical and production skills, related technology, employee relations, community issues, and health, safety, and environmental issues. The processes related to the workplace are taught as well, and clinical experiences are provided to strengthen the learning of subject matter.

In addition to subject matter specific to a particular industry or occupation, curricula must also include preparation in a common core of vocational and technical education knowledge and skills. These include sociology and economics of workplaces, work and family relationships, community and work relationships, general employability skills, work ethics, career and vocational development,

career guidance, customer and client relations, the process of acquiring crafts and learning about industries, occupational clustering and classifications, labor and organizational relationships, entrepreneurship, leadership training, and knowledge about economic change and its effect on relationships, education, training, and the need for lifelong learning. The related processes that are typically used in preparing students for an occupation or industry are also part of the workplace subject matter; for example, knowledge is provided about school-to-work transition programs, career academies, lab-based learning, simulations, clinical internships, how to access and use career and job information, tech prep models, career majors, community service activities, use of occupational performance skills, and standards and measures.

Professional education and pedagogy are equally critical to the preparation of vocational and technical education teachers. The heart of effective teaching lies at the intersection of subject matter, pedagogy, and the learner (Schulman, 1987). Teachers must be taught well to transform content knowledge into forms that are pedagogically powerful and yet responsive to the variations in ability, background, experiences, and learning styles of students. Teachers must be competent in a broad range of instructional repertoires that allow them to create multiple paths to whom and what they teach. They must become especially adept at teaching students how to frame and solve their own problems and to develop higher-order thinking skills (Interstate New Teacher Assessment and Support Consortium, 1992). The information taught and the pedagogy must be well grounded in empirical studies of teaching, the wisdom of practitioners, and skills needed in the classroom.

Instructional strategies must also include preparation in curriculum theory and instructional models and in use of available curriculum resources, textbooks, teacher's guides, video and audio tapes, computer software, and technology. The ability to use technology effectively is critical in business and industrial workplaces and in education. Programs of vocational and technical teacher education assure that their students are technologically literate. This includes, for example, that all students exit teacher preparation programs with technology skills in multimedia instruction, electronic presentation, distance learning, basic computer operation, word processing, data management and analysis, electronics communication, selection of hardware and software packages, and related ethics and impact.

Professional education must also include knowledge of educational ends, purposes, and values and their economic, historical, and philosophical grounds. It should include information on educational contexts, including vocational and technical education contexts, governance, democratic processes, financing, policy development, and the character and culture of communities and states. Professional education should also include study of the diverse schools or institutions in which vocational and technical education is offered (Lynch & Griggs, 1988; Schulman, 1987). Considerable attention must also be given to learning theory, cognition, individual and group motivation, human growth and development, social interaction practices, classroom communications, experiential learning, curriculum development, instructional planning, student assessment, learning proscriptions, setting standards, classroom management, program planning and evaluation, and other theories and practices congruent with high quality instruction (INTASC, 1992; NBPTS, 1993; NCATE, 1994).

Finally, supervised clinical experiences are a cornerstone in the preparation of vocational and technical education teachers. They begin early in the formal preparation program and continue throughout the students' life span as professional educators. Clinical experiences take place as appropriate and as related to the needs of learners, either as they are formally enrolled in preparation programs or as practitioners. Clinical experiences may include supervised internships or apprenticeships in business or industrial workplaces, in schools, in community colleges or technical institutes, in community settings, in social service and state governmental agencies, and in a variety of other settings. Clinical experiences may be short-term or extensive. Initial vocational teacher preparation programs include extensive clinical internships in more than one education environment; for example, in schools, technical institutes, community colleges, or adult education environments and with students from diverse population segments.

Principle #8. Programs reflect cultural diversity. Programs of vocational and technical teacher education embrace and value diversity in all components of the program and reflect a mirror image of this country's multicultural, pluralistic society. Programs strive to balance race, gender, ethnicity, linguistic, religious, and age diversity in faculty and student census. Courses and activities include readings, mentors, environments, cases, illustrations,

historical and contemporary references, resources, and clinical experiences that accurately reflect a pluralistic society and contributions from all of its people (Association of Teacher Educators, 1995; NCATE, 1994).

The faculty teach and teacher education students learn important underpinnings of multicultural education. They recognize that most of us were taught in classrooms where style of teaching reflected the notion of a single norm of thought and experience; however, this assumption of a universal norm is invalid and a barrier to learning for major groups of people. In multicultural populations in schools, students bring a plethora of abilities and aptitudes that are valued differently by their community and families. The ways in which this diversity affects learning is extremely important for teachers to understand, to value, and to challenge any oppression that may arise from it.

Faculty provide instructional experiences to enrich their own and their students' understanding of diverse cultures, the debilitating results of prejudice and discrimination, tenets of fairness and equity, stereotyping, mediating disputes between members of different cultural or racial groups, and accommodating disabled persons. Throughout the program, faculty and students become attuned to the diversity that is found among student populations and develop an array of strategies for working with it.

Vocational and Technical Teacher Education in Colleges and Universities

Principle #9. Colleges and universities (and their inherent administrative structures) that offer programs to prepare vocational and technical teachers are committed to such preparation and provide adequate resources to sustain them at high quality levels. There is evidence throughout relevant university, college, and department academic structures that vocational and technical teacher education is an important, viable component in the total instruction, research, and service functions of the institution. Such a commitment is reflected in mission or goal statements, strategic plans, promotional materials, catalogs, other statements and descriptions provided by the institution, and in statements of affirmation provided by academic presidents, vice presidents, and deans.

Vocational and technical teacher education programs enjoy parity with other professional programs–especially teacher education–at the university. Adequate human, capital, and financial resources are allocated to vocational and technical teacher preparation programs. Equity and fairness are evident in resource allocation, faculty assignment, salary levels and other rewards, amenities of the workplace, and perceptions of respect. Support for work- and school-based clinical experiences is provided. Criteria for faculty promotion and salary determination include considerations unique to teacher education in general, and vocational and technical teacher education in particular. Of special consideration is adequate compensation in the reward and merit structure for quality work in field-based experiences, inservice education, and action-oriented, collaborative research with practitioners in schools and other workplaces (Goodlad, 1990; NCATE, 1994).

Principle #10. Colleges and universities provide a clearly identified group of academic and clinical faculty for whom vocational and technical educator preparation is a top priority. The respective faculty responsible for preparing vocational and technical teachers are in charge of recruiting and selecting students, monitoring their progress, planning and maintaining the full scope and sequence of curriculum, integrating curriculum, evaluating and improving programs, assuring that programs are responsive to the continuing reform of vocational and technical education, and facilitating the entry and advancement of graduates into teaching and other educationally-related careers. Faculty are also given responsibility by the institution to develop and monitor accountability measures and to assure compliance with accreditation standards and measures (NCATE, 1994).

Colleges and universities provide organizational and administrative structures that support and enhance the work of faculty responsible for vocational and technical teacher education. Such faculty units are clearly distinguishable, have assigned time and responsibility for teacher education, and are closely aligned with other units responsible for the professional preparation of educators. Such a faculty may be drawn from various academic units, including those who primarily provide subject matter, arts and sciences, general professional education and pedagogy, and clinical experiences (Goodlad, 1990).

CONCLUDING COMMENTS

Ten principles serve as the foundation upon which programs, curricula, clinical experiences, standards, and measures that assure high quality vocational and technical teacher education may be based. These principles and the practices that stem from them demonstrate commitment to national patterns of academic excellence in vocational and technical teacher education programs. Educational and workplace research, effective practices, and wisdom have guided the development of principles and should continue to guide applications of the same in specific settings. Ultimately, these principles and tested practices should help to establish high standards for faculty, students, and programs.

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5

General Education and Subject Matter Education Components of the Vocational Teacher Education Program

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Vocational education at both the K-12 and postsecondary education levels is changing rapidly, often pressured by outside forces including increased priority to other areas of the curriculum, the changing economic and social context of society, and increased competition for fewer resources (Task Force on Vocational Teacher Education, 1995). In these circumstances, vocational education, in order to be successful and remain a vibrant part of public school-based education, must be transformed to serve the needs of the larger society and the interests of the individuals it serves. For vocational teacher education to be seen as part of the solution rather than as part of the problem, it must transform itself in ways that provide leadership and responsiveness to the need for change in vocational education. This chapter is directed toward advancing the dialogue and influencing decisions regarding the future aims and structure of vocational teacher education.

The major assumption of this chapter is that the purpose of vocational education is to enhance the vocational development characteristic of an educated person (Copa, 1992). Vocational development is seen as a lifelong process of developing the capacity for assuming vocational responsibilities. Vocational responsibilities are the expectations for accomplishment in social and economic roles in which individuals take responsibility to provide services or produce products of value to themselves and others. Vocational roles and responsibilities are particularly characterized by caring, commitment, and connectedness to the services and products being provided or produced and their impact on others. Full realization of human potential in vocational responsibilities is critical to human development and the social and economic progress of nations and the world.

A vocational development perspective includes attention to both short-term and long-term needs. Vocational responsibilities include the full range of work, family, and community responsibilities. All three have been a central part of vocational education from its inception–most notably in the form of paid employment, parenting and homemaking, and community service and development. These responsibilities also include being reflective and active in improving the state of affairs in work, family, and community environments.

Learning that enhances vocational development takes place in a variety of settings including home, school (i.e., pre-kindergarten, elementary, secondary, postsecondary), workplace, and other community settings. The degree to which an educational experience is directed toward vocational responsibilities can vary from general to specific, tangential to central. In some sense, all learning leads to vocational development; however, for the educational experiences typically labeled vocational education, the directedness toward preparation for vocational responsibilities is central and specific. Herein lies the uniqueness of vocational education in contrast to other subject matter areas of education.

This purpose of enhancing the vocational development characteristic of an educated person should direct the structure and pedagogy of vocational education. This chapter is intended to provide a futuristic orientation to the general education and subject matter components of a vocational teacher education program that would provide teachers with the necessary competence to achieve the purpose of vocational education. To provide an appropriate context, we start with the changing nature of work, family, and community responsibilities and roles.

CHANGING NATURE OF WORK, FAMILY, AND COMMUNITY

Prescribing the needed general education and subject matter education components of a vocational teacher education program should be justified by the answers to at least three layers of prior "why" questions. The first question is, "Why are these general education and subject matter education components being recommended?" The response to this first question would be a prescription for the nature of the vocational education program that the teachers are to teach. The second question is, "Why is this nature

of vocational education being recommended to be taught?" The response to this second question would be a prescription for the problem areas and concerns the learners are to be able to handle in their vocational roles and responsibilities. The third question is, "Why are these problems and concerns being recommended as the focus of vocational education?" The response to this third question would be to describe the nature of the present and future environments where vocational roles and responsibilities are being or will be lived out–work, family, and community. This cursory introduction to the changing nature of work, family, and community is not intended to be thorough and definitive in regard to the changing nature of these environments and their interactions. Rather, the purpose is to be sufficiently provocative about contemporary vocational roles and responsibilities so as to stimulate serious and imaginative thinking and discussion about the desired state of affairs in vocational education and, in turn, vocational teacher education.

Changing Nature of Work

The Secretary's Commission on Achieving Necessary Skills (SCANS, 1991) characterizes the changing workplace (see Table 1) as one that will require increased flexibility, teamwork, self-management, and continuous training by workers. From this perspective, a set of skills is recommended as necessary for work performance in the future and includes five broad competencies (i.e., resources, interpersonal, information, systems, and technology) and three foundational areas (basic, thinking, and personal skills). These skills are to be applied in the context of specific occupations. However, Bridges (*Job Shift*, 1994), Aronowitz and DiFazio (*The Jobless Future*, 1994), and Rifkin (*The End of Work*, 1995) describe how the very idea of jobs and occupations (and perhaps the educational programs clustered around them) as separable from one another is beginning to fade. The current emphasis is on the more general skills that allow for flexibility, responsiveness, and self-management in workers.

Changing Nature of Family

The meaning of *family* is undergoing changes as significant as those of the meaning of work. Family is taking on many definitions, from nuclear to other forms of cohabitation–some of the defining

Table 1
Characteristics of Today's and Tomorrow's Workplace

Traditional model	High performance model
Strategy	
• mass production	• flexible production
• long production runs	• customized production
• centralized control	• decentralized control
Production	
• fixed automation	• flexible automation
• end-of-line quality control	• on-line quality control
• fragmentation of tasks	• work teams, multi-skilled workers
• authority vested in supervisor	• authority delegated to worker
Hiring and Human Resources	
• labor-management confrontation	• labor-management cooperation
• minimal qualifications accepted	• screening for basic skills abilities
• workers as a cost	• workforce as an investment
Job Ladders	
• internal labor market	• limited internal labor market
• advancement by seniority	• advancement by certified skills
Training	
• minimal for production workers	• training sessions for everyone
• specialized for craft workers	• broader skills sought

Note. From *What Work Requires of School* (p. 3) by The Secretary's Commission on Achieving Necessary Skills, U.S. Department of Labor, June, 1991, Washington, DC: U.S. Government Printing Office.

features include being a social organization, living together (maybe not always physically), being committed to collective action, and providing mutual sustenance. A recent report released by the Population Council (*Families in Focus*, 1995), an international non-profit group based in New York City, synthesized a large number of family-related studies from several countries and suggests that the following changes are occurring in families:

- Whether because of abandonment, separation, divorce, or death of a spouse, marriages are dissolving with increased frequency.
- Parents in their prime working years face growing burdens, caring for children who need to be supported through more

years of education and caring for their own parents who are living longer.

- Unwed motherhood is increasingly common virtually everywhere.
- Children in single-parent households . . . are much more likely to be poor than those who live with two parents, largely because of the loss of support of the absent father.
- Even in households where fathers are present, mothers are carrying increasing economic responsibility for children. (*Star Tribune*, May 30, 1995)

These and other ideas about the changing nature of families are developed further by Coontz (*The Way We Never Were*, 1992) and Wallerstein and Blakeslee (*The Good Marriage*, 1995).

Clearly, these changes in families are closely interfaced with changes in work and community. For example, the extent to which women can be successful in providing increased or sole economic support for their children depends on the extent to which employment opportunities and conditions (e.g., wages and benefits), workplace cultures, and community services (e.g., day care and latch key programs) reflect recognition of women's roles in both the family and the economy.

Changing Nature of Community

The nature of community is also undergoing major changes. Etzioni (*The Spirit of Community*, 1993) highlights new forms of community that include

- Urban villages–places where neighbors know each other, members act together on political issues, various ethnic groups can live together without difficulty, and residents watch out for the welfare of each other's children.
- Small-town life and working at home–increasing numbers of people are moving out of the inner city and suburbs to smaller towns and, with the use of technology, taking their work with them.
- Non-geographic communities–communities made up of people who do not live next to each other but have formed strong connections because of where they work, study, care for their children, go to church, or recreate.

To strengthen new and traditional forms of community, Etzioni suggests that we (a) change orientation in terms of how we use our

energy, invest our time, and allocate our resources–changing our concepts of *making it* and *habits of the heart*; (b) work out conflicts between working and serving community; (c) redesign our physical environment (e.g., workplace, home, public spaces) to be more community-friendly (e.g., places to mingle, enhance sociological mix); and (d) foster volunteer endeavors that make wise use of our commitment to the common good–that is, ways that make it count (part of what community service-learning is about). These and other ideas about how communities are evolving at different levels and with new faces are presented by Walker (1993) in *Changing Community*.

Implications for Vocational Education and Vocational Teacher Education

It should be apparent from this very brief review of the changing nature of work, family, and community that the changes are substantial, the rate of change is increasing, and work, family, and community roles and responsibilities are increasingly interactive. On the latter point, see, for example, the thoughts and findings of Bellah, Madsen, Sullivan, Swidler, and Tipton (*Habits of the Heart*, 1985; *The Good Society*, 1991) and Kagan and Weissbourd (*Putting Families First*, 1991). We need only examine our own lives to see how these changes are being played out with real and personal consequences for ourselves and others.

So, how is vocational education to respond to these changes in its area of subject matter focus? What teaching and learning will best serve to insure that youth and adults are able to cope effectively with the challenges suggested by these changes? What are the implications for vocational teacher education programs that could legitimately claim to be providing leadership, first in its own area of practice, and then to education more generally? Nevin R. Frantz (May, 1995) has made a significant start in response to these questions in his report, *The Identification of National Trends and Issues for Workforce Preparation and Their Implications for Vocational Teacher Education*, but only as they relate to the changing nature of work. Similar efforts need to be initiated for the changing nature of family and community. This chapter will present two pathways into the future for vocational education and vocational teacher education with more specific implications drawn for the general and subject matter components of teacher education.

MODELS FOR THE STRUCTURE OF VOCATIONAL EDUCATION

One way to challenge thinking about the preparation of vocational educators is to propose a change in the structure of vocational education in secondary and postsecondary schools. In this section of the chapter, we describe the present structure and then sketch a description of how vocational education could be transformed.

Present–Collection of Separate Fields

Vocational education in its present form is made up of a collection of separate fields, each with a unique history and varying interrelationships over time (Plihal & Copa, 1994). The categorization of fields (now sometimes referred to as career majors for those fields with a paid occupation focus) has varied slightly over time, and some of the names of the fields have changed; however, the typical classification is agriculture, business and office, distributive (now marketing), health occupations, home economics (now family and consumer sciences), industrial arts (now technology), trade and industry, and technical (the latter two are difficult to differentiate and increasingly are viewed as one field). These fields include attention to regular and special needs students and vary in focus from general exploration of a cluster of related life roles to development of very specialized skills. For a complete review of the development of each of these fields from a curricular perspective, see Copa and Bentley (1991), who remind us that agriculture and home economics were the first separate fields to be called vocational education. Industrial education was next; business, distributive, and health occupations came much later. Most commonly today, vocational education is still structured and experienced as an assortment of separate and independent (to the extent resources will permit) areas of study, often with an array of course offerings that are treated as separate entities. Figure 1 depicts this structure of vocational education–a collection of discrete fields. This structure, described by Lynch in Chapter 1 of this monograph, is mirrored today in vocational teacher education.

Future–One Broad Field of Study

The broad field approach to curriculum integration involves developing some degree of synthesis or unity for an entire branch of

Figure 1. Vocational education structured as discrete subfields.

knowledge, or even for two or more branches of knowledge (Plihal, Johnson, Morgaine, & Liang, 1992). Examples of broad field subjects that encompass a single branch of knowledge are social studies, fine arts, physical science, and general science. An example of a broad field subject that includes more than one branch of knowledge is a humanities curriculum that ties together literature, history, the visual arts, architecture, drama, music, mythology, and philosophy. Another example of a synthesis of two or more branches of knowledge is the broad field of ecology that synthesizes knowledge from biology, physical science, social science, and agriculture (Tanner & Tanner, 1980). This approach to integration goes beyond using labels such as ecology to refer to a variety of subject areas that are still treated as disparate. It is a synthesis of related content into an entire program of study.

Currently, vocational education at the secondary school level is a rubric for a variety of courses, but it is not a broad field area of study. If the areas of vocational education that are now treated as discrete areas of knowledge were united into an area of study that focused on understanding their interrelationships, we could create the broad field of vocational education. If vocational education were conceptualized as a broad field, it could be offered to students as a comprehensive subject for learning about work, family, and community roles. Figure 2 suggests the structure of vocational education as a broad field of study.

Although vocational education is currently structured as a collection of distinct subfields (see Figure 1) for largely political and bureaucratic reasons, a reformulation of vocational education as a broad field of study is warranted on several counts:

1. The U.S. Congress seems to have had the idea of moving vocational education into more of a broad field direction with the Carl D. Perkins Vocational and Applied Technology Education Act of 1991. Congressional leaders recommended that vocational education address several dimensions of the world of work in addition to technical skills. The added

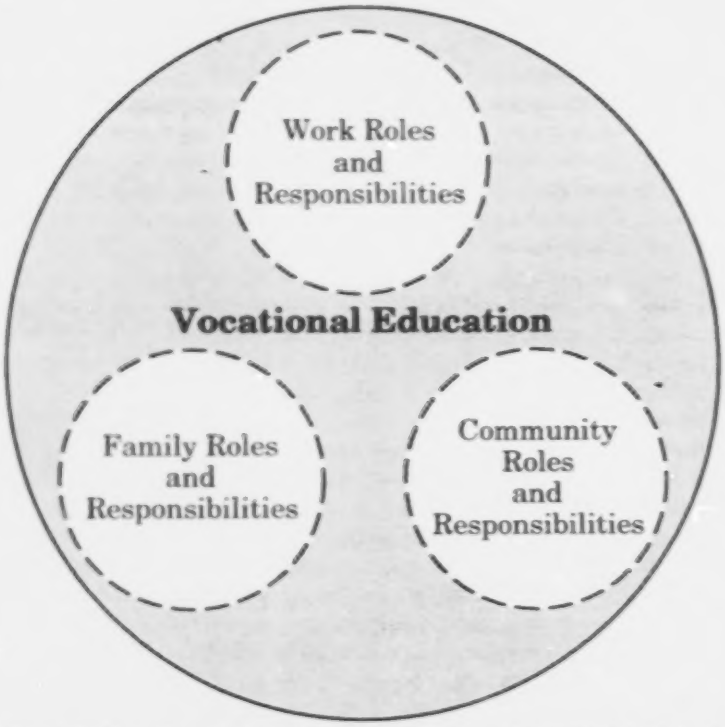

Figure 2. Vocational education structured as a broad field of study.

dimensions included finance, management and planning, labor, community, health, and environmental issues.

2. Federal school-to-work legislation envisions comprehensive programs to be comprised of a school-based component, a work-based component, and connecting activities.
3. Several states are combining or closely linking the school-to work initiatives with community service-learning initiatives in recognition of the close relationship of these programs in aims, pedagogy, learning settings, and assessment. Attention to education for family roles and responsibilities has a long history of association with vocational education, and, again, several states are using new organizational structures and concepts to link family education with education for work

and for community (e.g., the concept of lifework development, balancing work and family).

4. The myriad of themes and issues raised by Lynch in Chapter 1 of this monograph–some of which are echoed in the previous points in this list–call for an integrated curricular approach, not the subject-specific approach we have now. With this broad field approach, vocational education, perhaps under a new name, would be a required area of study for all students in high school.

Because vocational development is a component of human development, vocational education should be a part of everyone's education. Some aspects of vocational education would be the same for all individuals; at more specific levels, the content of the curriculum would vary in accordance with the specific vocational responsibilities that are of interest to the individual (e.g., family, work, community; within work, service versus production of goods).

The curricular content or subject matter of vocational education as a broad field of study needs to focus on learning that enhances success in vocational responsibilities taken as a whole and viewed more as a composite rather than as clusters of separate fields. The content of vocational education is, therefore, made up of the learning that makes for success in resolving the overarching and perennial problems or concerns encountered in taking vocational responsibilities. Because vocational responsibilities are made up largely of work, family, and community responsibilities, the problems or concerns of most interest are those that are consistently encountered in work, family, and community life. These problems or concerns arise because of the discrepancy between the desired state of affairs in vocational life wherever it is played out (i.e., home, workplace, community) and the present state of affairs. Table 2 illustrates a tentative categorization of the problems or concerns encountered in taking vocational responsibilities developed through a review of literature, observation, teaching, and related research experience (Copa, 1992). This listing of categories and illustrations is viewed as a place from which to start thinking about the content of vocational education rather than a definitive or exhaustive description.

The seven categories of problems or concerns presented in Table 2 appear over and over again in vocational life. Specific problems or concerns are resolved, only to appear again as individual interests,

needs, and contexts change. It is hoped that as learning and life progress, individuals undergo vocational development and become more competent with respect to resolving problems or concerns in each category. While technical skills make up only one broad problem area, they are still an important component of vocational education, but not the only or even the most important component. Much work needs to be done to identify, describe, and organize the specific problems that make up vocational life.

To decide what the general and subject matter components of vocational teacher education should be, we need to be clear as to what vocational teachers should be able to teach to their students. With the broad field view of vocational education, the problem areas shown in Table 2, along with the reasoning skills relating aims, context, options, and consequences in resolving these problems, become central to knowing what teachers need to be able to teach and, therefore, have significant implications for the general and subject matter education component of teacher education programs. The integration of vocational and academic education can become natural as learning experiences designed to resolve the problems of work, family, and community life draw on the various academic subject matter areas (see Figure 3). This integration will require that vocational teachers become more knowledgeable in the academic subject matter areas and that academic teachers become more knowledgeable of work, family, and community roles and responsibilities, in order to make the learning process more effective.

Advantages and Disadvantages of These Models

Vocational education structured as separate fields has the advantage of being familiar and well known. Teacher education programs, state departments of education, and K-12 and postsecondary schools have been organized in this way for many years–systems are in place and are designed to reinforce the structure and operation of vocational education as a collection of separate fields. But these structures are quickly eroding as funding for teacher education is reduced, state agencies reorganize to deliver on outcome- or results-based education, and students elect to study areas other than the separate fields of vocational education. Another advantage some perceive for vocational education structured as separate fields is the attention it brings to technical skills instruction. These individuals view technical skills as the unique focus and most

Table 2
Framework for the Subject Matter of Vocational Education as a Broad Field

Problem Area	Description	Illustrations of problem areas of work, family, and community life to be addressed
1. **Understanding work, family, and community (vocational) life.**	Anticipating and making sense out of the problems encountered at work, at home, and in the community.	• What should I do about finding my place in organizations which will allow me enough economic security that I can have choices about my work, family, and community life? • What is my role in work, family, and community organizations? • How can work help me to shape and know who I am? How is my self-identity expressed or denied at my work, in my family, and in my community? • How do I make good decisions about my employment, family, and community service? • What impact do work, family, and community have on the future of the world?
2. **Rights and responsibilities in work, family, and community life.**	Distribution of power and authority encountered in work, in family, and in community life. Characteristics of responsible workers, family members, and community servants.	• What are the sources of real power to get things done? What about feeling powerless? • What are my responsibilities at work, at home, and in the community? • Where are the sources of information on rights and responsibilities, and how do I use them (i.e., duties, OSHA, unions, ad hoc groups, human resource departments)? • How does work meet my needs for protection for me, for my family, and for my community (i.e., medical, legal, retirement, out placement, environmental)? • Who owns my good ideas, inventions, and new insights about work, family, and community? Can I prevent a former employee/employer/spouse from competing?
3. **Relationships in work, family life, and community.**	Interrelationships between individuals in work, family life, and community.	• How should I relate to peers; spouse; people different from me? • How should I relate to subordinates; children; people different from me? • How should I relate to supervisor; parents; people different from me? • What is my role when relations are harmonious? Troublesome? When should I fight? When should I take flight?
4. **Technology in work, family life, and community.**	Dealing with technology and technological change in work, family life, and community.	• How should I deal with technological change at work, at home, and in community? • How should I evaluate the effects of technological change? • What is the influence of tools and technology on work, family, and community values?
5. **General work, family, and community life competence.**	Concerns that are procedural in nature, but **general** across various work, family, and community responsibilities.	• What problems are mine to solve? How creative should I be? • How can I develop leadership potential? How do I handle leadership at the top? • How can I do it right the first time? How can I know that what I've done is what was desired? What is quality?
6. **Specific work, family, and community life competence.**	Concerns that are procedural in nature, but **specific** to selected work, family, and community responsibilities.	• How should I adjust a carburetor (for an automobile mechanic)? • How should I balance a budget statement (for an accountant)? • How should I discipline a child without destroying self-esteem (for a parent)? • How should I produce a newsletter (for an office worker or a volunteer)?
7. **Managing work, family, and community life.**	Managing one's own work, family, and community life.	• What style of life should I select? • How should I use my resources appropriately? • What changes should I consider in my work, family, and community life?

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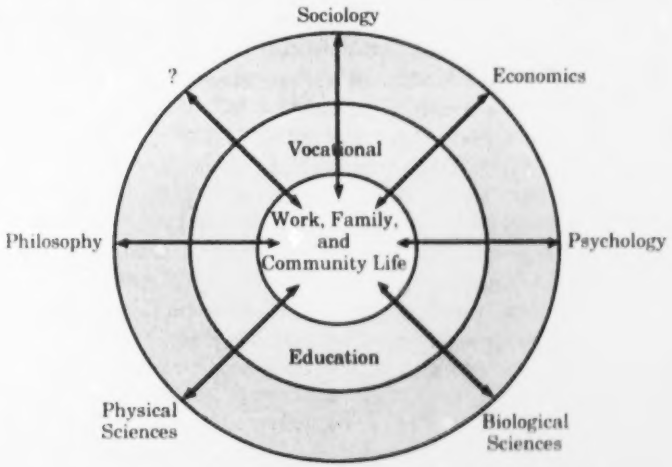

Figure 3. Integrating vocational and academic education around work, family, and community roles and responsibilities.

important contribution that vocational education can make. The changing nature of work, family, and community responsibilities calls this perception into question with its emphasis on flexibility and a wider range of skills (e.g., interpersonal relations, systems, self-management).

Some of the disadvantages of conceptualizing vocational education as a collection of separate fields should already be evident from the discussion of advantages related to this structure. First, the separate fields structure does not respond well to the changing nature of work, family, and community responsibilities. The separate fields, while once serving the professional field well, are now regarded by some stakeholders as being outmoded and a barrier to moving forward in imaginative and responsive ways to serve the needs of individuals and society. Even more importantly, the separate fields structure fails to recognize the growing importance of the interaction among work, family, and community responsibilities and interests. These disadvantages mitigate against (1) seeing vocational education as a significant part of the common education for all individuals, (2) balancing attention to the more general vocational skills (e.g., teamwork, decision making, leadership) with attention to specific

technical skills, and (3) increasing focus on the needs of the learner (to support vocational development) in contrast to subject matter.

A major advantage of structuring vocational education as one broad field of study is that such a structure is more congruent with our lived experience where work, family, and community are inseparable. The broad field perspective also supports the changing focus of education from subject matter to learner. As a broad field, vocational education would have the opportunity to be responsive to a wider variety of learner needs and interests and to deal with advancing vocational development from many different points. While technical skills may be one point of interest and departure, many other problem areas and concerns would be equally viable as a focus for teaching and learning. A broad field vocational education would be more likely to be a common area of study for all students, possibly reducing the tracking of students into vocational education or into narrow fields within vocational education. Further, the broad area of study would more likely lead to preparing students to be more flexible and accommodating to a rapidly changing world of work, family, and community. In the context of resource limitations, the opportunity within the broad field approach to share resources across the separate vocational education fields would be important.

The major disadvantage of viewing vocational education as one broad field is that it necessitates the work of completely rethinking the field and the many current structures and traditions tied to separate fields. Many who have tried to consolidate even two of the separate fields have found this no small task. Another disadvantage is that attention to a greater number and diversity of dimensions of vocational development may mean less attention to technical skills and to specific vocational roles such as narrow occupational titles. Most important, we would need to be vigilant so that increased attention to non-technical areas of competence did not cause a loss of attachment to applied contexts and experiential learning now at the heart of vocational education.

Viewing vocational education as a collection of separate fields or as one broad field has important implications for developing a responsive and effective vocational teacher education program. The two perspectives represent two different paths into the future. We would not introduce the broad field perspective if we did not see it as having value and viability.

MODELS FOR THE STRUCTURE OF VOCATIONAL TEACHER EDUCATION

Following the line of reasoning presented thus far, we now turn to a discussion of vocational teacher education. First we look at a model of teacher education that supports the perspective of vocational education as a collection of separate fields. Then we suggest an approach to teacher education that would be consistent with vocational education structured as a broad field.

Vocational Teacher Education as a Collection of Separate Fields

Given the assumption that teacher education programs are most effective if they model the desired features of professional practice in the field and institutions (i.e., K-12 and postsecondary) where their graduates will practice, then vocational teacher education programs designed to prepare teachers for vocational education structures as a collection of separate fields should not need to change much from their current form. Each field should maintain a separate program, whether they were housed together in a single unit (e.g., department, division, school) or in different units or colleges. There might be several areas of cooperation among the separate fields (e.g., marketing, admissions, selected courses, exit standards), but these should not interfere with or serve as impediments to maintaining separate programs for each field. While resource constraints might force cooperation, the cooperation should be a last resort and resisted to the extent possible in the interest of keeping programs as separate as possible. If resource constraints were severe, the separate programs might disperse to different units, even outside of colleges or schools of education, rather than sacrifice separate program identity.

Those already located outside of colleges or schools of education, or opting to move in that direction under the pressure of resource constraints, might entertain consolidation with non-education areas relating to the subject matter of their separate field rather than consolidation with other vocational education fields. Another move that might be taken in view of increasingly severe resource constraints is to cannibalize weaker fields (politically or in human resources) in the interests of the remaining fields. For example, home economics with its family orientation might be forced out entirely or marginalized

in joint courses by the more work-oriented fields that are in the majority; similarly, whole academic units might be reoriented and renamed with a work-related title to protect certain separate fields at the behest of others. Marketing and health occupations units, typically with only one or two faculty members, might be eliminated or taken over by areas with more staff members such as industrial or business education. And, emerging areas closely related to vocational education, such as community service-learning with its emphasis on experiential learning and cooperative work-study approaches, might be entertained as a part of vocational education units as long as they contribute to and do not threaten the separate fields. The survival drive of vocational teacher education as a collection of separate fields should be this strong if vocational education as a collection of separate fields is viewed as the desired state of affairs in K-12 and postsecondary education.

Vocational Teacher Education as a Broad Field of Study

In contrast, vocational teacher education designed to provide leadership to vocational education viewed as one broad field would move aggressively to consolidate and restructure its programs in the interests of professional practice and the youth and adults served by that practice. Education for work, family, and community should become the central focus of programs with particular regard to the interaction of these areas of life. All teacher education candidates, whether destined for K-12 or postsecondary practice, should first be prepared for dealing broadly with the problems and concerns of work, family, and community as a composite. Next, teacher education candidates might elect an area of specialization such as education for work, education for family, or education for community. Candidates should also be encouraged to consider a comprehensive specialization of education for work-family-community focusing on the interaction and contribution of these areas of life viewed as a whole. Following particularly for those wishing to practice in the latter levels of high school and at the postsecondary levels, teacher education candidates might select a sub-specialization within any of the specializations: Within education for work, sub-specializations might focus on traditional occupational clusters or even specific occupations or on problem areas in work life such as technological change, interpersonal

relationships, and quality assurance. Within education for family, sub-specializations might focus on early childhood development, family life styles, or parenting. Within education for community, sub-specializations might focus on service-learning, community development, or youth leadership. Notice that there is still a place for occupationally-specific skill development, but it is not the only or even the major organizer for thinking about the vocational teacher education structure. As a result, vocational teacher education would likely seek to be housed in a college or school of education in close interaction with other subject matter fields, given the increasing attention to integration of vocational and academic curricula.

IMPLICATIONS FOR GENERAL AND SUBJECT MATTER COMPONENTS OF VOCATIONAL TEACHER EDUCATION

What will happen if we reaffirm the view that teacher education should be designed for a vocational education that is a collection of separate technical fields? What will happen if we decide to embrace a new structure for vocational education—that of a broad field? Below we suggest implications of each of these stances for the general and subject matter components of vocational teacher education.

Vocational Education as a Collection of Separate Technical Fields

If we affirm the view that vocational education should be a collection of separate fields, the general and subject matter components of vocational teacher education would remain pretty much as they are. Efforts would need to be made to make sure that the curriculum is up-to-date with changes in each of the separate fields, both as regards general education and each of the specific subject matter fields. The assumption is that the general education component is met at the baccalaureate level by the liberal education requirement for the degree; the typical distribution requirement includes study of physical and biological sciences, history and social sciences, arts and humanities, and mathematical thinking. Using agricultural education to illustrate, the general education component

would be selected from among optional courses meeting the liberal education requirement, with preference given to courses related to agriculture. This strategy would lead to a preference for using a course in plant pathology to meet the physical and biological requirement, a course in agricultural economics for the history and social science requirement, and a rural sociology course for the arts and humanities requirement. The same strategy could be used by each of the separate vocational fields to address the general education component of the teacher education program. Every effort should be made to select as many courses as possible that relate in some way to the separate field.

Selecting courses to meet the subject matter component of the teacher education program is even more straightforward. First, some general distribution of courses is formulated to insure breath and depth of study in the subject matter areas. And then, either specific courses are prescribed or electives permitted within various categories. For example, again in the case of agricultural education, the distribution requirements within the subject matter area might include the categories of animal science, plant science, farm management, and agricultural mechanics. In addition, actual first-hand experience in a separate vocational field might be required as a prerequisite for admission to the program and/or through a field experience during the program. In some cases, credit would be directly given for subject matter education and experience gained at work or in technical and community colleges. In other cases, the teacher education program may have worked out cooperative agreements with technical and community colleges or business and industry for students to gain the needed competence. In all cases, every effort should be made to focus the general and subject matter education on the separate sub-field of vocational education with little regard for coordination among fields.

Vocational Education as a Broad Field of Study

When vocational education is viewed as one broad field, the implications for the general education and subject matter education components of the teacher education program are quite different from those described above (see Table 3).

First, with respect to the general education component, efforts would be made to provide a broad general education that helps

students understand the context and content of work, family, and community taken as a whole. Assuming the general education distribution requirements would still be appropriate (an assumption worthy of examination), the physical and biological sciences distribution requirement might be filled by an ecology course and another focused on the environment, the history and social science requirement by a course on democracy and capitalism along with a course on the history of the working class, and the arts and humanities requirement by a course on aesthetics paired with a course on urban or rural development. The aim is to prepare teachers to deal with the problems of living in the 21st century as regards work, family, and community and as described in Table 2.

With regard to the subject matter education component of the teacher education program, the focus would first be on the study of work, family, and community as a composite of vocational roles and responsibilities. Courses included here might address vocational development (not career development, which is usually associated only with paid work and then typically only professional positions), balancing work and family, and family and community. Next in priority, the course of study could become more specialized as teacher education candidates elect a specialization (i.e., work, family, community, or comprehensive study of all of the areas together) and sub-specializations as described above. For example, a candidate selecting a major in family education might select courses in the following areas:

- The family (knowledge of family forms, the meaning of families, family relations and communications, family functions and roles, and the family as a context for human development).
- Human development (knowledge of physical, social, cultural, intellectual, and psychological aspects of development over the life span).
- Family resource development and management (knowledge of human, material, and financial resources, their distribution, and the principles by which families manage them).
- Contexts of the family (knowledge about social-cultural-economic-political dynamics that interact with family well-being over time). (Plihal, 1989)

Table 3
Contrasting the Teacher Education Components of General Education and Subject Matter Education with Vocational Education Viewed As Separate Fields Versus One Broad Field of Study

	Vocational Education	
Program Component	As Separate Fields	As One Broad Field
General Education		
Physical and Biological Sciences	Related to Specific Field	Related to Work-Family-Community
History and Social Sciences	Related to Specific Field	Related to Work-Family-Community
Arts and Humanities	Related to Specific Field	Related to Work-Family-Community
Mathematical Thinking	Related to Specific Field	Related to Work-Family-Community
Subject Matter Education	One of the following: • Agriculture • Business & Office • Family and Consumer Sciences • Health Occupations • Marketing • Technology • Trade & Industry/ Technical	Core of Work-Family-Community Focus on one of the following: • Work • Family • Community

In a similar way, a vocational teacher education candidate who had majored in education for community and elected a sub-specialization in community service-learning might study in the areas of (a) nature of service, (b) community development, (c) youth development, and (d) adult mentoring.

CONCLUDING COMMENTS

Two alternative scenarios have been presented to stimulate thinking and discussion concerning the general education and subject matter education components of an effective vocational teacher education program. The programs are markedly different depending

on what one thinks is the best future structure for vocational education in light of the students it serves and socio-economic needs of our society. Should vocational education be structured as a collection of separate fields or as one broad field? The answer to this question has implications not only for the general and subject matter education components of vocational teacher education but also for its pedagogy and clinical experience components. If vocational education were to be addressed as a broad field focused on work, family, and community roles and responsibilities, all of teacher education would need to change, both academic and vocational, because of the required curricular integration. If vocational teacher education is to provide leadership to professional practice, rather than merely follow, or worse, act as a barrier to needed change, then the answer to the question of structure is indeed significant and has far reaching consequences for future students, the profession, and those with responsibility to prepare the professionals.

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6

CONTEMPORARY APPROACHES TO TEACHING AND LEARNING

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Vocational teacher education, like teacher education in general, is dynamic and ever-changing. Vocational education is just part of a larger educational movement in America that has been greatly influenced by the world of work and the need in a democratic society to prepare *all* people to enter into and progress in rewarding, productive, and meaningful work. Today vocational teacher education is in transition. Forces within federal, state, and local governments, as well as economic and societal changes, continue to affect expectations for professional development. The evolution from a behaviorist to a cognitive theory of learning has resulted in significant changes in approaches to instruction. In this chapter we present an overview of the contemporary approaches to vocational education (tech prep, curriculum integration, cognitive and work-based apprenticeships, career academies, and magnet schools), the resultant evolution of teachers' roles, and approaches to vocational teacher education reform.

BACKGROUND

In response to 1983's *A Nation at Risk* and the other national reports that followed, 47 states raised high school graduation requirements; 43 states added new test requirements; and all 50 states have reduced their dropout rates. Yet evidence continues to mount that high school graduates today are less well prepared to take their place in society than were high school graduates in the past. Workplace demands for certain skills and competencies have outpaced the ability of our current education system to deliver them

(Daggett, 1993; Fullen, 1993). Although Dewey (1916) recommended an integrated approach for education that would connect in-school education with vocations and culture, the American system has developed divergent educational paths that track students into vocational, college preparatory, and/or general programs. These tracks have not received equal treatment or respect within the educational system.

Advances in science, technology, and communications demand that today's workers possess literacy in courses comparable to those of the traditional college preparatory curriculum. Our technological world requires new and different skills. The greatest gap in our nation's history now exists between the skills young people possess when they leave high school and the skills they need to function productively in today's global society (Daggett, 1993). Furthermore, because the students of today can expect to change jobs every five to ten years, vocational education can no longer afford to focus on narrow fields of study; instead, vocational education must prepare students to deal with the challenges of a rapidly changing workplace and global economy (Centron, 1985). Schools must restructure to offer all students the skills that are required by today's and tomorrow's workplaces (Stasz, McArthur, Lewis, & Ramsey, 1990; U.S. Department of Labor, 1991).

This century's movement into a high-technology Information Age demands a new kind of education. There is little room in today's society for those who cannot manage complexity, locate and use resources, and continually learn new technologies, approaches, and occupations. Schools can no longer simply deliver instructional services–they must *ensure* that all students learn at high levels. In turn, the teacher's job is no longer simply to cover the curriculum but to enable diverse learners to construct their own knowledge and develop their talents in effective and powerful ways (Darling-Hammond, 1993). Strengthening education for the nonbaccalaureate students requires changing portions of the American education and training system–its curriculum; pedagogy; organization of time; assessment practices; technology; the skills and knowledge of its teachers; and the relationships among K-12, postsecondary education, and workplaces, and academic teachers, vocational teachers, learners, and employers (Berryman, Flaxman, & Inger, 1992).

Educators must design and implement learning systems that are sufficiently motivating and effective to ensure that all students

leave school with the skills and knowledge required in the workplace. To that end, learning activities should mirror what people have to know and how they have to use that knowledge in the workplace. In school a student's success often depends on individual performance; however, in the workplace success is increasingly dependent upon collaboration. Creating a community of expert practice (e.g., apprenticeships) is one approach toward eliminating the division between the in-school and out-of-school worlds. Knowledge and skills are more efficiently developed if courses are articulated with each other across the elementary and secondary grades, between secondary and postsecondary systems, and within the postsecondary system.

Major changes in the current educational infrastructure will be required to support and build a quality work-preparation system. Conventional measures of student learning need to be dropped in favor of authentic assessments that reflect real work situations. Curriculum development requires money, time, and effort and should be nationally coordinated to decrease duplication. Teachers should be encouraged to collaborate, which requires commitment of resources such as common planning periods and release time. Formal teacher education and development must be rethought and redesigned. In response to the changing demands of the teacher's workplace, certification requirements may need to be changed, and teacher testing should reflect the changing knowledge and skills. If teachers are to acquire a new set of knowledge and skills and work cooperatively with other teachers, teacher education must redesign its curriculum, methods of instruction, and performance assessment.

CONTEMPORARY APPROACHES IN VOCATIONAL EDUCATION

As we approach the 21st century, education faces imposing challenges; indeed, the very relevance of education in the U.S. has been questioned (Thomas, Johnson, & Anderson, 1992). Educators have begun thinking about what changes may be necessary in educational practice and the assumptions upon which current educational approaches are based. Although traditional vocational education was built upon behaviorist theories of learning, new conceptualizations of both teaching and learning can be developed,

using cognitive theory from educational psychology, to assist educators and policy makers in their efforts to reform education.

The Theoretical Bases of Vocational Education

Since the 1950s, education has been strongly influenced by theories developed in the behavioral sciences. Lundgren (1977) states that the foundation of curriculum theory can be found in the work of Thorndike, Bobbitt, Tyler, and Taba. Lundgren observes that curriculum reform began before the launch of Sputnik in 1957, during the years just after the second world war, when educators began focusing on the alarming deficiencies in mathematics and science knowledge found in high school graduates who had been recruited by the armed forces. To understand the curricular reforms that have been made, it is important to review briefly the theories (operative, associative, and cognitive) that have influenced educational reform.

According to Royer and Allen (1978), both Operant Learning Theory and Associative Learning Theory view humans as relatively passive recorders and processors of environmental events. In applied Operant Learning Theory, the individual experiences an external stimulus and responds to it. Environmental consequences such as reward or punishment following the event may influence whether the response will re-occur when the stimulus is presented again, but very little is said about the processes occurring inside the individual. In Associative Learning Theory, the individual is also seen as a passive recorder of external events, but the person forms an association between the stimulus and response. Learning is thought to occur through the contiguous occurrence of stimulus and response events. This knowledge is then analyzed into components or associations. Educational practice flowed from the assumption that these associations are refined through practice and reward.

In contrast to operant and associative learning theories, Cognitive Learning Theory holds that the individual actively participates in learning. The learner evaluates the importance of the new information, searches his/her memory for relevant existing knowledge, elects to store the new information in either general meaning or exact form, and incorporates the new information in a relevant context (Royer & Allen, 1978). In cognitive theory, learning involves *constructing knowledge* rather than just absorbing and

storing information or associating a stimulus to a response. Individuals construct new knowledge by interpreting the new information in the context of their prior knowledge and experience, and this knowledge is context-dependent (Thomas, Johnson, & Anderson, 1992). The task is to manage the appropriate inclusion of cognitive theory into instruction coherently, and to achieve this task, educators must be aware of the way "existing views of instruction fit with cognitive theory assumptions, with changing societal conditions, and with educational aims such conditions warrant" (Thomas et al., 1992, p. v). Just as operate and associative learning theories are the appropriate approaches for some educational problems; cognitive theory is appropriate for others.

Royer (1986) divides educational problems into four types: problems involving observable behaviors, problems involving the acquisition of basic information, problems involving the understanding of complex material, and problems involving problem solving and thinking. While he believes that operate learning theory is well suited for problems involving observable behaviors and problems involving the acquisition of basic information, he sees cognitive theory as being more appropriate for developing approaches to educational problems that involve understanding, problem solving, and thinking.

Resnick and Klopfer (1989) have called for curriculum reform based upon what they term the *Thinking Curriculum*, which requires educators to recognize that thinking is inherent in all real learning, that thinking skills can be taught and learned, and that systemic change of educational systems will be necessary to ensure that "thinking pervades students' lives from kindergarten onward, in mathematics and history class, in reading and science; in composition and art, in vocational and special education" (Resnick & Klopfer, 1989, p. 2).

While Piaget and others argued for many years that real knowledge is not knowledge acquired by memorizing and that real understanding is best developed through constructive activities at the learner's own natural rate of development, their critiques were difficult to apply to programs organized to demonstrate student mastery on school tests. Piagetian and Gestalt theories of thinking, while resulting in hands-on laboratories and process skills in science, for example, seemed difficult to integrate with the scientific knowledge about which reasoning was to occur.

Cognitive theory, according to Resnick and Klopfer (1989), resolves this problem. They see thinking and learning as merging in cognitive instructional theory. The following themes help to organize cognitive learning theory:

- People learn most easily when they possess organizing schema to use to interpret and elaborate upon new information.
- People acquire more knowledge over time; it follows that they also develop expertise over time.
- Because learning requires *generative knowledge*–knowledge that can be used to interpret new situations, to solve problems learners must be able to elaborate, question, examine, and build new knowledge in relation to other information to build new knowledge structures. (Resnick & Klopfer, 1989, p. 5)

The challenge for educators, of course, is how to help students develop a generative knowledge base upon which they can build throughout life. Resnick and Klopfer (1989) address the problem with the following ideas:

- Skill and content must be taught at the same time.
- Cognition and motivation must be joined. Self-regulation is essential in cognition. Motivation intrinsic to the content of instruction is needed rather than external rewards or punishment.
- Thinking skills (for example, modeling and peer tutoring, critical thinking) can be taught.
- Cognitive apprenticeship, described as paralleling traditional apprenticeships, can promote learning communities. Cognitive apprentices need to be given a real task, contextualized practice of tasks, and plenty of opportunity to observe others doing the work they are expected to learn.

Royer (1986) discusses the transfer of learning (the ability to apply skills and knowledge) in terms of (a) *near transfer*, in which the learning situation is very similar to that in which the skill or knowledge will be applied, and (b) *far transfer*, in which the student performs the skill in a context very different from that of the classroom. Royer also makes a distinction between (c) *literal transfer*, which involves the transfer of an intact skill or knowledge to a new learning task, and (d) *figural transfer*, which involves the use of some segment of world knowledge as a tool for problem solving, thinking, or learning.

Johnson and Thomas (1994) have identified six principles of instructional design, based upon cognitive learning theory, that can enhance learning:

- Reduce load on limited working memory,
- Activate existing knowledge structures,
- Support encoding and representation of new knowledge,
- Facilitate "deep thinking,"
- Enhance cognitive control processes, and
- Support the use and transfer of knowledge and skills.

Berryman, Flaxman, and Inger (1992) identified several approaches that are relevant to strengthening educational opportunities for all students: tech prep (2+2), integration of vocational and academic education, cognitive and work-based youth apprenticeships, career academies, and career magnet schools. These programs are all still evolving. (Table 1 presents a comparative display of these contemporary approaches.)

Tech Prep

Tech prep education is a key strategy for building a school-to-work system and is a significant participant in the education reform movement in the United States. Tech prep programs, one of the fastest growing curriculum innovations in the U.S., are based on the recognition that the workforce of the future will require both higher levels of technical skills and stronger foundations in applied academics. In the late 1960s a few states began to articulate high school and community college vocational programs. These connections were strengthened in the 1970s when postsecondary vocational education programs were expanded. In 1984 the National Commission on Secondary Vocational Education, in *The Unfinished Agenda*, proposed changes in vocational education. The Commission also encouraged infusing practical, work-relevant applications into academic courses and theory and academic content into vocational courses (National Commission on Secondary Vocational Education, 1984). Congress mandated restructuring in the Carl D. Perkins Vocational and Applied Technology Act of 1990 (Perkins II), the primary piece of legislation supporting the training needs of the non-baccalaureate-bound student. Perkins II requires states receiving federal funds under the Act to (a) develop programs of sufficient size, scope, and quality to be effective; (b) integrate academic and vocational education; and (c) develop programs to address the needs of special

Table 1

Contemporary Approaches to Teaching and Learning

Approach	Characteristics	Strengths	Challenges
Tech Prep	• Articulation agreement between secondary and postsecondary institutions. • 2+2 Design: 2 years secondary + 2 years postsecondary, leads to associate's degree or certificate in specific career. • Common core of math, science, communications, & technology.	• Combines academic rigor with applied instruction. • Option to continue to baccalaureate level (2+2+2). • Appropriate for nearly all career areas.	• Resistance to career-oriented concepts. • Support from stakeholders. • Limited resources, funding. • Postsecondary-level curriculum reform. • Need to emphasize teacher training. • Addition of work-based learning • Assessment of programs and students.
Integration of Vocational & Academic Curriculum	• Modification of academic and vocational philosophies. • Applied focus in learning activities. • Balances theory with application. • Coordination between teachers and counselors.	• Uses vocational ed. settings to apply & reinforce academic skills & content. • Education becomes more life-relevant. • Replaces didactic instruction with activity-centered and/or problem-solving. • Appropriate for all students.	• Requires organizational change in schools. • Requires interdepartmental cooperation and collaboration. • Design and implementation takes time. • Need for assessing benefit to students. • Need admin. and community support.
Cognitive Apprenticeship	• Instruction makes thinking "visible." • Situated learning and guided discovery. • Students learn from errors. • Implicit feedback. • Modeling, scaffolding, and coaching.	• Integrates theory and practice, thinking and action. • Can be used to teach almost any subject. • Ideal for integration of vocational and academic education.	• Requires major changes in curriculum, instructional strategies, assessment, etc. • Requires comprehensive teacher training. • Requires shift from individual to collaborative instructional activities.
Work-Based Youth Apprenticeship	• Work experience and learning in industry. • Linkage between secondary and post-secondary; leads to high school diploma, postsecondary degree or certificate. • Collaboration among groups is necessary. • Modeling, scaffolding, fading, coaching.	• Creates a learning situation that includes the skills and knowledge required by workplace.	• Requires significant employer participation; workplaces are transformed. • Potential conflict between employers' and students' needs. • Requires collaboration and cooperation between schools and employers.
Career Academies	• School-within-a-school run by team. • Career field focus, rather than job prep. • Integrated voc. and academic content. • Includes necessary workplace skills. • Employers involvement.	• Career focus may keep high-risk students in school.	• Requires employer participation. • Potential conflict between employers' and students' needs. • Requires collaboration and cooperation between schools and employers.
Magnet Schools	• Has a single-focus, rather than comprehensive school orientation. • Organizes an integrated curriculum around the demands of a specific industry. • Students acquire skills for future careers.	• Grounds cognitive development in applied setting. • Students gain job-related skills. • Includes an in-school apprenticeship.	• Costs may be higher. • May have longer day, less free time. • Fewer electives for students. • Limited resources for students who need remediation or counseling.

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populations. Perkins II was designed to give states wide latitude in programs and services.

Tech prep is a program spanning two years at the secondary level and two years at the postsecondary level in higher education or apprenticeship training (2+2) that includes a common core of mathematics, science, communications, and technologies and leads to an associate degree or a certificate in a specific career (Hoerner, Clowes, Lachowicz, Wehrley, & Hammons, 1992). It is considered a dual-purpose program of study, which means that students are prepared to enter a vocational or technical program, a college preparatory program, or a combination of the two. Tech prep does not undermine the academic system; in fact, research shows that the tech prep program of study can strengthen the academic achievement of all students (Hull & Parnell, 1991).

There are two major approaches to the articulation of tech prep:

1. *Advanced placement program* (time-shortened program), which eliminates unnecessary redundancy, grants advanced placement in postsecondary programs, and completes postsecondary programs in less time; and
2. *Advanced skills program*, which eliminates unnecessary redundancy, adds more advanced training (high-technology emphasis), and completes postsecondary programs with higher-level skills (Dutton, 1990).

Tech prep can also be connected to youth apprenticeship and work-based learning programs, where it serves as the foundation for linking to postsecondary training and/or to training in the workplace.

The secondary-level tech prep program runs parallel to, but does not replace, the secondary-level college preparatory program. Tech prep combines a common core of learning and technical education; rests on the foundation of basic proficiency in math, science, communications and technology; presents content in applied settings; consists of a structured and closely coordinated curriculum; and builds on career clusters of technical systems. Tech prep, through the applied approach, prepares students to function effectively in a complex world.

Now that secondary-postsecondary articulation agreements are widespread, as is inservice of vocational and academic teachers (Bragg, 1995), educators need to concentrate on common-core curriculum, academic and vocational integration, and career guidance. Most of the curriculum reform has focused on the secondary level. It appears that secondary educators participate in more

development and curriculum activities than do postsecondary educators. Vocational faculty, counselors, and administrators are more likely to participate than academic teachers, regardless of the level.

In a National Center for Research in Vocational Education (NCRVE) survey, local tech prep coordinators reported that state agency personnel, vocational faculty, postsecondary administrators, and local businesses were supportive of tech prep concepts, while secondary administrators and school boards were less enthusiastic but still supportive (Bragg, 1993). Bragg reported that only 11 percent of local coordinators indicated that tech prep was appropriate for "all students–the audience favored by many contemporary education reforms including the school-to-work legislation" (p. 20). Bragg notes that the perception that tech prep's purpose is to prepare the students in the academic middle for two year postsecondary education–while the academically gifted pursue baccalaureate degrees and the rest go to work–is alive and well. In short, tech prep is still perceived by many as a program that limits students' options. Bragg (1995) identifies the challenges facing tech prep:

- Continuing resistance to career-oriented concepts,
- Lack of clear policy,
- Waning support from students, parents and employers,
- Too little resources (money, time, people),
- Limited curriculum reform at the postsecondary level,
- Too little emphasis on teacher preservice and inservice,
- Addition of work-based learning, and
- Lack of program evaluation and student assessment (Bragg, 1995, pp. 21-23).

Bragg (1995) suggests six basic concepts that must be reinforced to ensure that progress in tech prep continues:

1. Tech prep must be grounded in an integrated, rigorous curriculum that creates student-focused, experiential instruction at both the secondary and postsecondary level.
2. Formal articulation is needed to connect secondary programs to the postsecondary level. Articulation should increase educational and career options for students rather than limit them.
3. School-to-work opportunities and tech prep must be linked.
4. Tech prep should be outcomes-focused to ensure that graduates develop the competencies needed to achieve their

goals. Program evaluation is essential—to determine how tech prep is working and to facilitate continuous improvement. Performance-based assessments should be used.

5. Tech prep should ensure access for *all* students, students at every point on the academic-ability continuum. Support systems must be developed and readily available.
6. Tech prep's foundation is collaborative implementation. Responsibility for education must be shared by educators, employers, workers, parents, students, and others.

Integration of Vocational and Academic Education

Integration of vocational and academic education requires the examination and modification of the educational philosophies of both vocational and academic education (Blank, Holmes, & Scaglione, 1992). As academic and vocational instructional methods and strategies are similarly examined and modified, academics are taught via applied learning activities that incorporate relevant real-world and workplace problem-solving into the curriculum. Thus, "integrated, academic education becomes more life relevant and career focused and more hands-on and vocational education becomes more academically rigorous and less narrowly focused on preparing students for specific jobs" (Blank, Holmes, & Scaglione, 1992, p. 6).

Integration of academic and vocational education is achieved through applied academics (math, biology/chemistry, physics, and communications). Applied courses, which are offered to all students–college prep or tech prep–are required for tech prep. Applied academics balances theoretical concepts and workplace applications. Academic principles are taught in the context of real-life applications that are transferable to life and work situations. This type of integrated, hands-on instruction can be provided only with extensive orientation to the philosophy and goals of applied academics, as well as inservices in special methods of teaching using the applied approach. Appropriate academic teachers should receive inservice training before attempting to teach using the applied approach. Integration usually involves additional coordination among counselors and academic and vocational teachers in the school setting.

There are many approaches to integrating vocational and academic education, each dependent upon the support and

commitment of the school administration and the community. Eight models of integration have been successfully implemented in schools:

- Incorporating Academic Competencies into Vocational Courses,
- Combining Academic and Vocational Teachers,
- Making Academic Curriculum More Vocationally Relevant,
- Modifying Academic and Vocational Education–Curriculum "Alignment,"
- Adopting the Academy Model,
- Replacing Conventional Departments with Occupational Clusters,
- Single-Occupation High Schools, and
- Electing Career Paths or Occupational Majors (Grubb, Davis, Lum, Plihal, & Morgaine, 1991; "Models of Integration," 1995).

Lynch, Smith, and Rojewski (1994) report the that literature "identified the integration of academic (theory) and vocational education (practice) as critical to the reform of secondary vocational programs . . . [and called] for new or revised courses and programs that were rigorous, challenging, with high standards, and technologically up-to-date" (p. 107). Lynch et al. advocate a modified curriculum that emphasizes contextualized instruction–presenting "authentic work-based problems" in realistic settings and maintaining rigorous academic standards (p. 107). They envision programs built around broad career clusters that connect school and work. In addition to changes in curriculum, Lynch and colleagues propose "challenging student outcomes" that include "job specific and transferable skills, fundamental academic skills, practical problem solving skills, skills with advanced technologies, and employability skills, including leadership" (pp. 107-108). These proposed changes require instructional reform measures that are based upon our current understanding of thinking and learning and include innovations such as modeling, experiential learning activities, using video and multimedia technologies, and other interactive methods that engage students actively in learning (Lynch, Smith, & Rojewski, 1994).

If curriculum integration is to fulfill its promise, support must be provided for staff development, teacher preparation, release time, and collaborative planning. Present initiatives are expected to result in increased collaboration among teachers, increased enthusiasm

and improved teaching and learning, and a more "coherent curriculum" (Holmes, Williams, Gurchiek, Peake, Goldstein, & Mainwood, 1992, p. 65). With an integrated approach, barriers between the disciplines are reduced and interdisciplinary collaboration replaces isolation. Holmes et al. acknowledge the importance for integration at the secondary level but advise curriculum integration at the elementary level as well, to reduce segregation and student tracking.

Cognitive and Work-Based Youth Apprenticeships

Apprenticeship has existed since ancient times. Perhaps the oldest form of vocational education, its natural and holistic approach to teaching and learning begins with observation of the craft to be learned, continues as the learners practice and master first simple and then increasingly complex tasks–while they learn the underlying theory and principles of the craft. The master (teacher) first models the skills, provides appropriate scaffolding as the apprentices progress toward mastery, coaches, provides feedback, and corrects. As the apprentices become expert, their knowledge of underlying principles and incremental practice helps them develop self-monitoring abilities. As western civilization developed, formal schooling largely replaced this ancient approach to teaching (Collins, Brown, & Holum, 1991). However, as Collins, Brown, and Newman describe it, apprenticeship "embeds the learning of skills and knowledge in the social and functional context of their use"; and this traditional model of skills instruction has now been adapted for use in formal education and renamed "cognitive apprenticeship" (1986, p. 1). Another apprenticeship model, work-based youth apprenticeship, involves collaboration between the workplace and the school in order to provide students with work experience and an integrated vocational and academic curriculum that leads to a diploma or skills certification.

Cognitive Apprenticeship. Traditional apprenticeship involves learning a tangible and observable activity. In formal education, however, many of the target skills (i.e., problem solving) are internal and invisible. Cognitive apprenticeship is the application of traditional apprenticeship methods to the teaching of mental processing. "Cognitive apprenticeship is a model of instruction that works to make thinking visible" (Collins, Brown, & Holum, 1991, p. 6). It has

been used successfully in mathematics instruction (Schoenfeld, 1985) and applied mathematics (Fischbach, 1993), in reading (Palincsar & Brown, 1984), and in writing instruction (i.e., Collins, Brown, & Newman, 1987; Duncan, 1995; Flower, 1993; Flower & Hayes, 1980; Flower, Wallace, Norris, & Burnett, 1994).

Cognitive apprenticeship is a well-developed concept, but it has rarely been implemented as a fully-developed model. It is a learning paradigm, a curricular and instructional strategy that can be used as part of any organizational option. Cognitive apprenticeship is based in the theory of how people learn most effectively. Traditional apprenticeship presumes that the activities being learned are constant; cognitive apprenticeship focuses on developing the skills and knowledge that are needed when activities change. Because cognitive apprenticeship grounds the skills and knowledge in realistic problem-solving, it prepares students for the workplace of the future, which will require problem-solving. In cognitive apprenticeship teachers facilitate and guide student learning, while students learn to work in the context of real-world tasks (Berryman et al., 1992). Cognitive apprenticeship instructional activities include

- *Modeling*. The teacher models expert performance of the skill to be learned.
- *Scaffolding*. Instructional supports are provided (i.e., the number of variables may be limited; strategies may be provided). The scaffolding is removed incrementally as students develop competence.
- *Situated learning*. Realistic workplace contexts, such as case studies, may be used.
- *Guided discovery*. Learners are encouraged to solve problems and see the results of their efforts in a controlled (safe) environment.
- *Learning from mistakes*. Mistakes are expected, as a natural part of the learning process, and students are encouraged to learn from their mistakes.
- *Implicit feedback*. Learners attempt to solve the problem at hand and then infer whether or not their results indicate success.
- *Coaching*. Teachers provide appropriate coaching and assistance.
- *Self-monitoring*. Learners reflect on past experience and devise improved strategies for future activities (Berryman et al., 1992; Collins, Brown, & Newman, 1986).

Cognitive apprenticeship, with its combination of theory and application, is a useful model for integrating vocational and academic curriculum:

> [It] preserves the best of . . . vocational and academic education and integrates them into a single model that can be used to teach almost any subject . . . Since cognitive apprenticeship is designed to create a well-prepared mind at ease with the demands of real world tasks and equipped to continue learning, it retains the option of postsecondary education for all students. (Berryman et al., 1992, p. 25)

Rosenshine (1986) includes many of the characteristics of cognitive apprenticeship in his summary of research on effective teaching. The six effective teaching functions he describes include modeling the target skill, guided practice (coaching) that leads to independent practice, incremental learning steps that build on acquired skills and knowledge, and peer collaboration. Rosenshine recommends these methods for teaching explicit skills but acknowledges that cognitive apprenticeship methods are also proving to be useful in less structured areas such as writing and problem solving.

Cognitive apprenticeship is appropriate for both in-school and workplace-based education. However, its use in schools will necessitate significant changes in curriculum design, the roles and functions of the teacher, the roles and responsibilities of students, as well as the instructional schedule (Berryman et al., 1992; Duncan, 1995).

Work-based Youth Apprenticeship. Another apprenticeship model, work-based youth apprenticeship, involves both the workplace and the school in a collaborative program designed to provide students with work experience along with an integrated vocational and academic curriculum that leads to a diploma or skills certification. Youth apprenticeship is intended to serve those students who will not pursue a four-year college degree. In youth apprenticeship, students finish school with work experience and a relationship with an employer that may lead to a skilled job.

Just as cognitive apprenticeship is a flexible rather than static model, Bailey (1993) reports that there is no single work-based youth apprenticeship model. However, he notes that all youth apprenticeship programs "shift some formal, organized education from secondary or postsecondary classroom into the workplace" (p. 4). Bailey observes that although youth apprenticeship models may

differ in their treatment of particular aspects of their programs (i.e., certification, curricular reform, collaboration between institutions), they all include "structured education at the workplace" and all seek to "keep open the option for postsecondary education" (Bailey, 1993, p. 5).

Jobs for the Future (1991) describes the three basic elements of youth apprenticeship programs:

- Work experience and guided learning opportunities provided for participants by employers within an industry or occupational cluster;
- A structured linkage between secondary and postsecondary components of the program, leading to high school diploma, postsecondary credential, and certification of occupational skills; and
- Close integration of academic and vocational learning and of school and workplace experiences through planning and ongoing collaboration between schools, employers, relevant unions, and other key institutions, and through innovations in curriculum and instructional strategies in the classroom and at work. (p. 2)

Berryman and colleagues (1992) report that interest in work-based youth apprenticeship has grown out of (a) observations of the apprenticeship systems in Europe, especially in Germany, and (b) from research that advocates the integration of in-school and workplace-based learning. The American version of the German dual system may have no fixed definition; however, four components are at its heart:

- *Target population.* It is designed to be an integral part of the basic education of a broad cross-section of youth. It is not equated with programs for specific occupations or with narrowly defined target groups such as at-risk youth.
- *Educational content.* Its educational content integrates and coordinates vocational and academic education. Apprenticeship programs are designed to teach broad employability and social skills. The adults in the learning situation play the roles of coach and mentor.
- *Location of instruction.* A significant part of the basic education program takes place on the job and is to be complemented by classroom instruction.
- *Credentials.* Apprenticeship has a system of stringent vocational/academic credentials for students who successfully

> complete the program. It presumes that employers will recognize these credentials as certifying achievement of specified levels of skills. (Berryman et al., 1992, p. 55-56)

Developing a program that incorporates all these elements is challenging. Work-based youth apprenticeship *should* ensure that the learning situation and activities respond to the knowledge and skill demands of the particular workplace/industry/occupational cluster. However, this is not always the case. The workplace may be organized around segmented tasks that are not challenging enough to be an apprenticeship location. It may be more difficult to ensure that the students develop a clear understanding of the governing principles in the particular domain because of their implicit, rather than explicit, inclusion in the curriculum (Berryman et al., 1992).

Critics and advocates of work-based youth apprenticeship acknowledge that this approach faces major problems or challenges; as described by Bailey (1993) they include

1. Securing industry/employer participation.
2. Developing and maintaining high quality on-the-job learning.
3. Attending to issues of equity.

Work-based youth apprenticeship must also respond to the question about how part-time jobs affect the school work of high school students. Research into this question has resulted in contradictory findings, according to Frantz (1995). Some studies have found that working students' in-school achievement was negatively affected and that students developed cynical attitudes about work; however, other studies reported "that the effects of employment depended upon the quality and amount, the quality of supervision and the integration of the work experience with the school curriculum rather than whether a student worked or not" (Frantz, 1995, p. 22). According to Frantz, cooperation and collaboration between workplace and school, to ensure that a work experience has educational value, is the critical factor in whether or not working has a negative impact on the student's performance in school.

Career Academies

Career academies prepare students for both work and college. The program of study in a career academy is relevant not only to employment, but also pertinent to success in pursuing a four-year college degree. The educational aims of an academy include delivering

an integrated curriculum as well as providing a smooth transition from school to work. An academy encourages teacher collaboration and a sense of administration, teachers, students, and parents working together to provide opportunities for students. A career academy

- Is always a school-within-a-school, run by a small team of teachers from various disciplines, instructing a subset of students taking common courses.
- Focuses on a set of careers in fields with high demands and many employment opportunities, rather than training for a specific job.
- Integrates vocational and academic content; offers instruction in general employability skills.
- Involves employers in program planning, instructional delivery, and student mentoring; may provide employment as part of the curriculum. (Berryman et al., 1992, p. 51)

Academies exist in many forms, which may or may not contain all the characteristics identified above. Are academies successful in keeping students in school? Berryman et al. (1992) report that longitudinal surveys of students in California revealed no fundamental differences in the "patterns of employment and postsecondary schooling of academy and non-academy students" (p. 51). However, other findings are not so conclusive; some suggest the academy experience will keep students in school, while others indicate academy students perform better and after graduation become employed, serve in the military, or continue their education. Evaluations of academies seem to be positive, especially in the collaboration of teachers and leadership and student retention (Berryman et al., 1992).

The literature suggests that academies may cater to the less-advantaged student. But there is strength even in this. Academies may keep a student (even one who is academically unprepared and needs remedial or basic skill instruction) in school because it is career-oriented and focuses on employment and the real world. There are also drawbacks; unlike tech prep and work-based youth apprenticeship programs, academies usually do not articulate learning with postsecondary institutions or the workplace. Career academies may also cost more to operate than a traditional system; therefore, they may drain resources from the school's normal programs (Berryman et al., 1992).

Career Magnet Schools

Berryman, Flaxman, and Inger (1992) provide a concise and comprehensive definition of career magnet schools:

> Career magnet schools provide both career and college preparation by integrating vocational and academic education within a "theme" or "focus" school . . . organize vocational and academic training around the demands of an industry. . . . provide a vocationally and academically integrated education for all students. Academic subjects are taught as related and functional disciplines, contextualized and given shape by the school's career theme. . . . vocational classes are developed and taught to provide a broadly applicable framework for the academic disciplines while also giving students skills that are directly relevant to future careers. (Berryman et al., 1992, p. 47)

Career magnet schools may differ in their structure; some are separate programs (school-within-a-school) while others operate school-wide. The structure of the curriculum may also vary, but courses of study generally tend to be more highly structured than those in comprehensive high schools. The career magnet schools usually have a longer school day and students have less free time and fewer electives. This narrow focus results in the school's explicit, well-defined learner outcomes and a similarly focused faculty and staff. Career magnet schools may also provide in-school apprenticeship experiences. Strong links to local industries and businesses are vital to career magnets; they are vital sources of technological and economic support as well as hands-on experience (internships and work-study programs). Although career academies encourage collaboration between the school and the workplace, they do not follow the youth apprenticeship model of developing on-the-job instruction (Frantz, 1995).

Often existing in school districts in larger cities, career magnet schools prepare students for work and college because the vocational curriculum is relevant and the academic curriculum is rigorous. These schools are usually thought to court the more advantaged student, but they may also be perceived as discriminatory—as "segregated schools for minority and non-college-bound students" (Berryman et al., 1992, p. 53). Unlike tech prep and youth apprenticeship, magnet schools' educational programs are not

articulated with postsecondary institutions or the workplace (Berryman et al., 1992).

Cost is a significant problem for career magnet schools. Their need for specialized equipment and resources means that they normally cost more than traditional schools. Over time they become more cost effective (maintaining a program is not as costly as implementing one); however, developing magnet schools is difficult because their funding may be seen as a diversion of limited resources and attention away from the basic academic curriculum, at a time when graduation requirements are increasingly rigorous (Grubb et al., 1991). Local policies and collective bargaining agreements can also make both school-based hiring and curriculum reform difficult. Finally, the literature suggests that magnet schools have not been successful in educating students with very poor academic records due to a lack of resources for remedial and counseling services (Berryman et al., 1992).

CHANGING TEACHER ROLES

Traditionally, vocational teachers were expected to be competent in the skills of the occupation they taught. Over time, it was recognized that skills competency alone did not guarantee an ability to teach, and by the mid 1930s it was believed that teachers should possess both a college degree and work experience. As vocational education moves into the 21st century, the relevant vocational competencies required of its teachers are increasingly high-tech and sophisticated. Furthermore, contemporary approaches to education (tech prep, integrated curriculum, cognitive and work-based apprenticeship, career academies, and magnet schools) require teachers to employ instructional methods that may differ significantly from what they were taught as they prepared to become teachers. Teachers must become collaborators, facilitators of learning, and lifelong learners. The evolution from a behaviorist to cognitive learning theory base for vocational education has changed teachers' roles significantly.

As Cantor (1992) describes effective teachers, (a) they care about their subject; (b) they possess basic competence in their subject; (c) they want to share their knowledge; (d) they possess self-knowledge, knowledge of the learner, the subject, and appropriate instructional

techniques; and (e) they comply with administrative requirements and ethical responsibilities. At any given time, school systems will employ teachers who may not be proficient in, nor cognizant of what is required by the new vocational education initiatives. The school system must ensure that teachers grow professionally and meet the changing needs of the school. Inservices, conferences, or work with a consultant may not provide sufficient professional development (Lieberman, 1995). Since teachers are likely to teach as they were taught, they must be given the opportunity to learn in situations that are similar to those that they are expected to provide for students. Teaching about new approaches is not sufficient; training or staff development that is unconnected to the classroom may not support teacher learning or new practices. The principles of active learning apply–teachers must be given opportunities to learn, practice, try, revise, and develop expertise in the new practices.

School reform and changes in teaching practice should be supported through expanded efforts toward the professional development of teachers. Many of the contemporary initiatives in educational reform, including those in vocational education, require skills quite different from those that teachers were and are presently being taught. For example, integration of vocational and academic curricula requires teachers to collaborate in the planning, implementation, and evaluation of the integrated programs because adequate curricula are not readily available (Stasz, Kaganoff, & Eden, 1994). In cognitive apprenticeship, vocational teachers must be aware of the metacognitive dimensions of their own expertise so that they can (a) articulate their own problem-solving strategies and processes as they model the relevant occupational skills; (b) provide scaffolding to support their students' efforts; and (c) coach, correct, and give feedback to students as they work toward mastery. In youth apprenticeship programs teachers must coordinate in-school and workplace learning and ensure the rigor of the workplace-based learning activities–again, collaborating with other teachers and the participating business or industry. Professional development is essential if teachers are to prepare for their new roles and adjust to change; team building training, for example, can help teachers collaborate more effectively.

Professional learning seems to be more easily assimilated when programs last longer than one or two days. The pursuit of professional education should be fully enculturated into the school and fulfilling

the role of professional learner should be an expectation of all teachers (Lieberman, 1995). Professional learning may take place within or outside of the school. Lieberman summarizes both traditional approaches to professional development and some ideas about new kinds of learning:

- Teachers' professional development has been limited by lack of knowledge about how teachers learn.
- Teachers' definitions of the problems of practice have often been ignored.
- The agenda for reform involves teachers in practices that have not been part of the accepted view of teachers' professional learning.
- Teaching has been described as a set of technical skills, leaving little room for invention and the building of craft knowledge.
- Professional development opportunities have often ignored the critical importance of the context within which teachers work.
- Strategies for change have often not considered the importance of support mechanisms and the necessity of learning over time.
- Time and the necessary mechanisms for inventing, as well as consuming, new knowledge have often been absent from schools.
- The move from "direct teaching" to facilitating "in-school learning" is connected to longer-term strategies aimed not only at changing teaching practice, but at changing the school culture as well.
- Networks, collaboratives, and partnerships provide teachers with professional learning communities that support changes in teaching practices. (Lieberman, 1995, p. 596)

Much has been written since 1990 concerning the need for a workforce that is competent in higher level thinking skills as well as basic academic and vocational skills. Carnevale, Gainer, and Meltzer (1990) detailed the essential skills employers want. These skills, while ranging from learning to learn and basic literacy skills, also stress interpersonal skills, creativity, problem solving, negotiation, teamwork, and other higher level skills. While vocational teacher education has in the past emphasized cognitive and psychomotor skills specific to specific subject matter areas, Carnevale's research

challenged the teacher educator to look beyond technical skills to higher level personal development skills. Senge (1990) suggested that the workplace of tomorrow will be a learning organization in which the *soft* skills of interpersonal relationships, communication, and teamwork will be as important, if not more so, than the technical skills traditionally stressed in vocational teacher education. Wirth (1992) examined the relationship between education and work and supported a democratic socio-technical workplace that required adaptable people with skills in abstract thinking, inquiry, and collaborative problem solving.

APPROACHES TO REFORM

As vocational teacher education programs are reformed, teacher education faculty must be committed to their students and to students' professional development as lifelong learners. Faculty must have a grasp of the concepts inherent to lifelong learning and must model lifelong learning concepts. Teacher education faculty must themselves be continuously learning.

Faculty must be as familiar with the workplace as they are with the school setting; the school setting must reflect the environment of the workplace. Berryman and Bailey (1992) noted that the changing workplace diminishes the effectiveness of traditionally delivered education. The reduction of managerial and technical support staff, the delegation of job responsibilities downward as organizational structures flatten, the constantly changing technology, and the reduction of separate job categories demand that teacher education programs reflect the flexibility and pace of today's workplace. Learning environments must take on the technical, social, and motivational characteristics of the workplace. Teacher educators must provide learning experiences for prospective teachers that reflect the context of the workplace.

It follows that clinical experiences must take a different approach. Meade (1991) noted that the National Board for Professional Teaching Standards, the Holmes Group, the Center for Educational Renewal, and other groups have called for major reforms in the clinical experiences of prospective teachers. In *Tomorrow's Teachers*, the Holmes Group called for reforms such as professional development schools; the Carnegie Task Force argues for the establishment of

"lead" schools. Most of the reform groups call for clinical experiences in schools where the students represent diversity and that integrate teacher development and instructional programs. They also call for a variety of pedagogical practices, partnerships between college faculty and supervising teachers, and clinical experiences that extend through an entire school year.

Many of the reforms stress a change in the role of the supervising teacher. In the past the supervisory role has been assigned to the teacher and there was little or no training in how to supervise or mentor the student teacher. Payment of a stipend or assignment by the principal often have been the criteria for teachers assuming the supervisory role. Reforms call for a clinical experience in which college faculty members and classroom teachers work together in planning and carrying out the clinical experiences, with college faculty helping to train the clinical teachers and acting as resources (Meade, 1991). The responsibilities of both the college faculty and supervisors change dramatically, resulting in renewal for both. The implications, according to Meade, are that schools and school systems would formally accept some responsibility for teacher preparation. Schools would have to be reorganized to allow their teachers to accept additional responsibilities for their interns as well as their own professional development. Further, college faculty and clinical supervisors would work together in the schools, teaching and holding meetings and other seminars for interns. Extended clinical training would give interns status as members of the school's instructional staff and compensation for their internships (Meade, 1991).

A number of teacher education programs are changing preservice programs to reflect educational reform through developing Professional Development Schools (PDS). "Since the late 1980s, more than 200 PDSs have been created through the collaborative efforts that simultaneously restructure schools and colleges of education" (Darling-Hammond & McLaughlin, 1995, p. 598). Teacher interns have an opportunity to work closely within the PDS concept with mentors, university supervisors, and expert practitioners. PDSs provide situations in which research may be carried out by the interested parties.

The Holmes Group, the Carnegie Forum on Education and the Economy, and the National Board for Professional Teaching Standards recommend that preservice teachers do student teaching and/or internship in PDSs. If PDSs are to become important in

teacher education, states must recognize and fund them. They should also become part of the certification/licensing process. The National Council on Accreditation of Teacher Education (NCATE) is considering the place of PDSs when developing standards for preparing teachers. Even with the above considerations, PDSs are not considered part of the mainstream teacher education programs. (Darling-Hammond & McLaughlin, 1995)

Frantz (1995) reported eight major implications–obtained from the 22 institutional representatives who serve on the University Council for Vocational Education–that are important for improvement of policy and practice for vocational teacher education:

- All teachers, counselors, and administrators of secondary and post-secondary education should have a broad based philosophical understanding of the purpose of education and the role of vocational education in the restructuring and improvement of workforce preparation of youth and adults.
- Teacher education programs should be structured to optimize the subject matter relationships and collaboration needed between "academic" and "vocational" education teachers in preparing students for the workplace.
- A common knowledge base should be developed that provides a philosophical, sociological, economical and psychological foundation for vocational teacher preparation programs.
- The technical and organization practices of the workplace as well as current pedagogical concepts and practices should be incorporated into teacher education programs.
- Vocational teachers should be prepared for new leadership roles that will require skills in working with community based, school, and political groups in restructuring education for the needs of the workplace.
- Contextual learning strategies should be emphasized in the preparation of teachers as the means for linking education and the workplace.
- The concept and importance of career development throughout one's life should be an integral component of teacher preparation programs.
- The structure, context, and organization of vocational teacher education programs should be focused on the linkages between workforce development and the education that will provide well qualified persons for the workplace. (pp. 28-29)

Lynch (1993) believes that colleges and universities have a significantly diminished capacity to produce vocational and technical education teachers. Additionally, there is little agreement on subject matter and related pedagogy. Lynch states that although beginning teachers know about the major initiatives (i.e., tech prep, curriculum integration, school-to-work transitions, and special populations), most are not taught how to connect theory to practice so that they can be instrumental in beginning the process of systemic change. Lynch would have beginning teachers prepared to engage in these initiatives.

Frantz (1995) presented a position statement called "Preparing Teachers for the Nation's Workforce: A Statement from the University Council for Vocational Education," in which he states that (a) teachers must be able to link with workplaces; (b) teachers should be prepared to be leaders in the schools and community; (c) teachers should be taught the importance of and possess a comprehensive understanding of workforce preparation; (d) teachers should be prepared to focus on contextual relationships among subjects rather than to focus on disciplines; and, (e) teachers should be prepared to collaborate (plan, teach, integrate, and contextualize curricula) to prepare their own students either to enter the workplace or continue their education.

CONCLUDING COMMENTS

Enthusiasm for teacher education had a profound impact upon the vocational education movement and upon the first Federal act for vocational education, the Smith-Hughes Act. Teacher education has always been the safeguard for quality in vocational education. Even though Federal legislation made it mandatory that states provide adequate programs of vocational teacher education, all states have developed their systems of certification and/or licensure individually.

Vocational education has long fulfilled two divergent roles: (a) a means of providing an education for at-risk student who might drop out, and (b) a program of study for lower income students. By the late 1800s, secondary schools were increasingly viewed as preparation for mid-management jobs in industrial firms. Vocational education continued to spread even though it was viewed as narrow and utilitarian.

When Congress passed Perkins II, opportunities were provided for vocational education to become a player in educational reform. A number of innovations–tech prep, integration of vocational and academic curricula, performance standards–are being implemented, but with varying stages of commitment across the country. Many models of tech prep have developed since Congress passed the Tech Prep Education Act of 1990 as part of the Perkins II. The Act was designed not only to raise standards and keep students in school, but to encourage them to enter the postsecondary level. The integrated hands-on curriculum was supposed to promote the importance of postsecondary education.

School reform did not begin in the 1990s. Throughout the 1980s there had been pressure from varying forces for schools to become more accountable for what they were teaching; this accountability seemed to be measured by standardized testing and raising graduation requirements. National goals have been set; however, there has been very little national direction on what should be taught, perhaps because states retain authority over schools and have delegated much of their power to local boards of education. This dispersion creates an educational system that varies greatly across the nation, even though *Goals 2000* supports national education standards and skill standards. These differences create problems when a state determines to measure student learning by some sort of standardized testing. According to the local school district the student may be performing at an appropriate standard, but that student may not perform well on the state assessment. This may appear to indicate that the student has not learned or the school has failed, when in fact, the content of the test was different than what had been taught. Thus, curriculum alignment becomes critical to the educational revolution. Alignment, in its simplest terms, is telling a student what you are going to teach, teaching it, and then testing what you actually taught. The concept of curriculum alignment may mean changing some of the assumptions currently held in teacher education. It will definitely mean preparing teachers to determine what they should teach and how they should communicate to students what they should learn.

Passage of the School-to-Work Opportunities Act of 1994 confirms that an educational revolution is under way. Schools should consider creative approaches to achieving excellence. Schools must create an environment of flexibility and response to societal and economical

needs. They must prepare students to be lifelong learners because the demands of society and the workplace are ever-changing. Vocational and technical programs have a necessary role, but they can no longer afford to operate in isolation within the school curriculum. Vocational-technical educators must begin to work collaboratively with academic educators. The educational problem is not the sole problem for either group of educators and cannot be solved by either group working separately. The role of vocational education at the secondary level is again being questioned. Is vocational education really necessary if academic teachers can teach employability concepts through applied academics?

School reform requires that teacher preparation programs focus on issues different from those that existed in the past. The demographics of the school population are rapidly changing, and teacher preparation programs must ensure that teachers are able to teach *all* students. There continues to be a lack of teachers who represent the changing demographics of the student population. Programs must look at the attitudes, knowledge, and skills that will enable teachers to interact with others who are different from themselves. Teachers need to understand their students' abilities and learning strategies, ages and developmental levels, attitudes, motivations, and prior conceptions of a subject. In addition, the teacher must understand the political, social, cultural, and physical environmental contexts. If preservice teachers are to become competent, extensive field/clinical experiences must be provided. Partnering relationships should be developed between schools, business-industry, parents, and the community as a whole. Teacher educators must provide learning experiences for preservice and inservice teachers that reflect the context of the workplace, specifically opportunities to practice collaborative learning. Teacher education must provide opportunities for classroom teachers to practice binding curriculum and learning activities to career fields and ultimately to postsecondary programs of study. Programs should improve their academic rigor, quality of students, liberal arts components, knowledge and skills needed for working with special populations, technological knowledge and skills, admissions and graduation requirements, preservice/inservice preparation, recruitment of minority students/teachers, and approach to the role of teaching (Pratzner & Ryan, 1990; Pratzner, 1988, 1987).

Should vocational teacher preparation programs concentrate on content and skills, pedagogy, or andragogy? Should the teaching-learning process be teacher-directed or student self-directed? Camp (1992) suggested a teacher preparation model that was a collaborative effort among teacher education institutions, state departments, local school systems, and local school teachers. While in the past, content and skills were considered the most important aspect of teaching, more recent studies suggest that pedagogy and/or andragogy may be the most important. This comprehensive model could utilize both pedagogy and andragogy. These two models do not represent bad/good or child/adult dichotomies, but rather a continuum of assumptions to be checked out in terms of their rightness for particular learners in particular situations. Pedagogy, which is teacher directed, is appropriate for young students or those who are novices with the content. Andragogy, on the other hand, requires a facilitator of learning, who helps the maturing human being become a self-directed learner. At any given time, pedagogy or andragogy may or may not be successful with a particular set of learners. "The pedagogical model is an ideological model which excludes the andragogical assumptions. The andragogical model is a system of assumptions which includes the pedagogical assumptions" (Knowles, 1990, p. 64). Kennedy (1991) revealed in a research study that majoring in an academic subject does not guarantee that teachers will have the knowledge they need to teach. The study also revealed that multicultural courses and knowledge about cultures did not necessarily enhance the ability of teachers to relate to children of different groups. Findings suggest that structural changes (such as required subject matter courses) in teacher education will not guarantee improved teaching.

Inservice education or teacher development should not only be reconceptualized, but should consider the teacher's definition of the problem when planning professional learning. The agenda for school reform, which calls for changes in teacher practices, should be considered in the planning process. The professional learning opportunities should consider the context of the teacher's job and should be presented over a period of time rather than a short-term approach. Networks and partnerships provide teachers with "learning communities that support changes in teaching practices" (Lieberman, 1995, p. 596).

The *National Assessment of Vocational Education* (1994) reports some startling facts. There is little evidence at the secondary level to show that vocational education improves the earnings or employment status of graduates. Enrollments are declining and students with higher abilities are choosing other courses. Secondary programs remain very traditional despite having received Perkins II funds for four years.

As vocational teacher education programs respond to these charges, many changes should take place. Among them are the following:

- The environment and learning experiences must reflect both the school setting and the workplace.
- Clinical experiences must integrate teacher development and instructional programs and extend through a school year.
- Colleges must seek financial support for students entering a year-long extended clinical experience.
- Clinical experiences must be in schools where the student body represents diversity.
- Teacher education faculty must be flexible and open to continuous change.
- Teacher education faculty must become versed in the reform initiatives and investigate ways to make them meaningful to preservice and inservice teachers.
- Teacher education faculty and classroom teachers must work together to supervise the clinical experience, to teach, and to provide seminars for interns.
- Teacher education faculty must deliver instruction utilizing technology, for example, computer presentation packages and optical disc technologies in the classroom and distance education via two-way compressed video or satellite.
- Teacher education programs must provide learning experiences that reflect the reform initiatives in vocational education.
- Teacher education programs must utilize both pedagogical and andragogical models throughout the educational process.

Secondary vocational education programs are only as strong as the teachers prepared by teacher education programs.

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7

An Alternative Vision for Assessment in Vocational Teacher Education

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As educators, business leaders, and politicians work toward the development of world class standards for high school graduates, as described in the *National Education Goals* (National Education Goals Panel, 1993), new forms of assessment are needed to determine the quality of education provided in schools, districts, states, and the nation as a whole. In response to the need for new forms of assessment, the field of vocational teacher education has begun to question its current approaches to assessment and is looking for new ways to assess both learning and instructional programs. Evidence of this trend can be seen in the recent changes in the standards for program accreditation developed by the National Council for Accreditation of Teacher Education (1987). In addition, many states have recently developed new competency examinations in vocational education that are being used to make teacher certification decisions.

While considerable work is being done to improve assessment in vocational teacher education, much of the effort serves a summative purpose: to provide information to enhance decision making regarding selection, advancement, certification, accreditation, and promotions. For example, assessments are required by states and national accreditation groups to determine the overall quality of teacher education programs, future teachers are required to pass standardized competency tests upon completion of programs before teacher certification is granted, and follow-up studies are conducted that focus on overall impressions of program quality as perceived by program graduates. Because these common types of assessment serve a summative role, they too often fail to provide the formative information teacher educators need to adapt, refine, and upgrade their instruction to improve student learning. The purpose of this chapter is to review current methods of assessment in vocational teacher education, identify weaknesses inherent in those methods, examine the relationship between professional standards and

assessment practice, and explore contemporary assessment approaches that support instructional decision making. The ultimate goal of this chapter is to present an alternative vision of assessment for vocational teacher education, a vision that views assessment as an essential activity conducted by teacher educators for the purpose of improving teaching and learning rather than a process aligned with program accreditation and teacher licensure decision making.

FORMS OF ASSESSMENT IN VOCATIONAL TEACHER EDUCATION

Assessment in vocational teacher education is controlled by a variety of internal and external forces and takes many forms. Much of the assessment activity in vocational teacher education focuses on program evaluation, while other assessment examines learning and students' attainment of predetermined standards. Some forms of assessment are controlled by state and private agencies who offer accreditation to programs that meet a predetermined set of standards. Other forms of assessment are controlled by state departments of education who require that prospective teachers pass standardized competency tests and meet minimum course work requirements before they are granted teaching licenses. Still other forms of assessment are conducted by teacher educators and focus on individual student learning. While these forms of assessment serve different purposes, they have inherent weaknesses that limit their usefulness for guiding learning and instruction.

Assessment for Accreditation Purposes

Program evaluation is often conducted to determine the overall quality or value of a program and to grant formal accreditation. If a program meets the predetermined standards, program accreditation is granted. Program evaluations of this type serve political needs by ensuring program quality in public institutions. As a result, virtually every program that prepares teachers becomes involved in program evaluation.

Assessments for making accreditation decisions are typically conducted by external agencies. Most often these agencies are

private organizations such as NCATE or governmental agencies such as state departments of education. To receive program accreditation, teacher education faculty review the standards for accreditation and then document their compliance with those standards. As a result, external agency evaluations are primarily descriptive. The evaluations focus on a review of documents (e.g., syllabi, course and program objectives, catalogs, institutional reports) that are compared to approved standards in areas such as course requirements, course content, credit hours required, and faculty qualifications.

While external agency evaluations provide the illusion of thoroughness and rigor, they are primarily evaluations of programs as they exist on paper. The political agenda served by these evaluations reduces the amount of useful feedback provided to teacher educators. Hence, while they serve the purpose of assessing the overall quality of a program, at least as it can be documented on paper, external agency evaluations are not explicitly designed to provide results that lead to improvements in teaching and learning.

Assessment for Teacher Licensure Decisions

Decisions to grant teaching licenses are made when prospective teachers satisfy state licensure requirements. Typically, these requirements include successfully completing an approved vocational teacher education program and achieving a passing score on a standardized competency test.

Successful completion of an approved program involves completing all required course work, maintaining a minimum grade point average, and demonstrating satisfactory performance throughout clinical experiences in schools. Due to the diversity of teacher education programs within a state and the large number of teachers who apply for certification in a year, decisions regarding licensure rarely involve more than ensuring that a checklist of items has been completed. For example, student transcripts are reviewed to determine if the courses required by the certification agency and the teacher education program have been successfully completed. Seldom does the assessment involve a critical analysis of the course content and experiences or the actual competency level of the individual applying for licensure.

Assessment for Making Instructional Decisions

While not typically used for certification and licensure purposes, performance in individual courses is another common form of assessment in vocational teacher education. Through a variety of assessment techniques, individual instructors evaluate student work on daily assignments, course projects, and examinations. Many of the paper and pencil assessments done in vocational teacher education programs serve a summative purpose (i.e., to assess achievement of learning outcomes for the purpose of assigning grades); however, they also provide instructors with formative information regarding student learning that can be used to modify instructional content, sequence, and methods.

While pencil and paper tests tend to dominate educational assessment, numerous alternative assessment strategies are used in vocational education. For example, performance and skill assessments are common in the lab courses taken by prospective vocational teachers. These are particularly powerful assessment methods due to their emphasis on practical application of the knowledge and skills taught in the technical courses. Alternative assessment methods are common even in core professional courses where prospective teachers are assessed as they complete traditional teaching tasks such as developing curricula, planning lessons, presenting content, and assessing learning.

PROBLEMS WITH CURRENT METHODS OF ASSESSMENT

The current methods of assessment for making accreditation, licensure, and instructional decisions are wrought with weaknesses. The most troubling of these weaknesses are the overemphasis on testing, the difficulty of establishing standards, the lack of congruence with professional practice, and the focus on specific skills rather than holistic performance.

Over-Reliance on Conventional Testing

Educational tests were originally developed to allow decision makers to assess students' general levels of ability and achievement and to make quantitative comparisons between either individual

students or various groups. This norm-referenced approach to testing was used primarily for selecting students for programs and for assessing the outcomes of instruction (Frederiksen & White, 1990). The use of tests began to have a greater impact on education in this country when the National Assessment of Educational Progress (NAEP) was funded by Congress in 1969. NAEP's role was to determine trends in education and report those trends to Congress. The need to periodically conduct national assessments of 9, 13, and 17 year olds led to a search for more efficient administration and scoring of tests, which resulted in an over reliance on multiple-choice tests (Frederiksen, 1990).

While the use of standardized tests to assess educational outcomes was thought to be the answer to the problem of educational assessment, there is an intensifying dissatisfaction with testing in education. In fact, many educators now believe that tests can have a negative effect on teaching and learning (Kirst, 1991). The reasons for the dissatisfaction with tests include

1. Conventional testing, with its emphasis on factual knowledge, promotes memorization rather than understanding (Collins, 1990; Linn, 1991).
2. Rather than focusing on the important metacognitive and critical thinking skills, instruction guided by testing tends to emphasize rote learning through drill and practice exercises.
3. Conventional tests cannot easily assess the methods students use for problem solving and typically fail to identify the misconceptions students may hold (Frederiksen & White, 1990).
4. Tests lead students to believe that there is always one right answer, problems are well-structured, guessing is inappropriate, and the right answers always reside in the head of the teacher (Collins, 1990; Kirst, 1991).
5. Tests can lead to a narrowing of the curriculum as teachers "teach to the test" and students learn what the test will measure (Frederiksen, 1990; Kirst, 1991).

Difficulty in Establishing Standards

Considerable assessment activity in vocational teacher education involves the administration of competency tests to support admission, grading, graduation, and certification decisions. The problem with competency tests lies in the difficulty in interpreting test results.

What does a test score actually mean? What cut score distinguishes poor performance from adequate performance?

A recent study illuminated the perplexing problems associated with the setting of testing standards (Ellwein, Glass, & Smith, 1988). Ellwein and colleagues studied five sites where competency tests were used and standards for those tests were being set. The sites included three state agencies that oversaw testing for making high school graduation, college admission, and teacher certification decisions and two local districts that used tests to make grade promotion and graduation decisions. Through an ethnographic investigation, several key points surfaced relative to the appropriateness of tests for making critical education decisions. First, it was found that test standards are set according to *how many should pass and fail rather than on what should be known.* This emphasis on quantity (i.e., norm-reference) rather than quality (i.e., criterion-reference) reduces the chances that educational assessment will lead to better understanding of student performance and improved instruction. Second, "safety nets" were common when tests were used for decision making. These safety nets were used to protect the examinees and to prevent large numbers of people from failing. Some of the safety nets identified in the Ellwein et al. study included allowing students multiple attempts to pass a test, using alternative tests or standards for students who fail, overruling test results, exempting some students from testing, and lowering the standards if too many students fail. Third, it was noted that competency tests and standards serve as symbolic and political indicators of quality in education. To create the desired image for policy makers and the general public, testing standards must "appear" rigorous and conform to general notions of competence. As a result, standard scores often give a false impression of the scientific rigor of testing.

Lack of Congruence with Professional Practice

Because educational assessment methods are biased toward assessing acquired knowledge, little attention is given to actual professional performance (McGaghie, 1991). This problem is evident in all professional competency assessments including the medical, legal, and educational professions. The lack of congruence between assessment practice and actual professional practice brings up the question of the validity of professional assessments such as those

used to certify teachers. In fact, performance on professional exams has been shown to have little correlation with actual performance on realistic tasks (Samson, Grave, Weinstein, & Walberg, 1984).

Focus on Specific Skills Rather Than Holistic Performance

The current approaches to teacher education assessment have also led to a focus on specific skills rather than holistic performance. Evidence of the decomposition of knowledge and skills can be found in instructional design courses that emphasize the skills of curriculum development (e.g., task analysis, concept mapping, unit and lesson development) without concern for the situational contexts in which curriculum development occurs (e.g., financial, personal, and professional constraints, interpersonal conflicts, community and school board influences). The focus on specific skills is also evident in instructional methods courses that emphasize skill development in areas such as lesson planning, presenting, evaluating, questioning, and classroom management as though they were isolated acts with little relationship to the context in which instruction takes place. In many programs students must wait until the end of their teacher preparation program before they are given the opportunity to apply their learning in real contexts.

The current trend toward constructivism, in which learners construct their own understanding based on their prior knowledge and their contextual experiences, suggests that teacher preparation programs should emphasize holistic performance through experiential learning in real settings. Assessment of professional competence needs to build on the constructivist views of learning and emphasize the entire range of professional roles, tasks, and competencies of teachers.

RELATIONSHIP BETWEEN PROFESSIONAL STANDARDS AND ASSESSMENT PRACTICE

The term *Standards* has become a professional buzz word in many segments of national and world society. In our global economy, standards are thought to be inducements for quality improvement and a basis for certifying product quality. In education, the same goals prevail. However, the National Education Goals Panel's report

(1993) emphasizes that our schools are not organized around high standards for our students. Instead, they report that at best we have a minimum curriculum reinforced by mediocre textbooks and teaching methods. The standards movement in American education is a powerful tool that can be used to spur reform. It can place emphasis on learning for all children and adults. It also places emphasis on exceptional performance as a norm rather than for just a few.

From a definitional standpoint, standards are what all students should know and be able to do with their knowledge (*National Education Goals Report*, 1993). Standards are thought to be rigorous and involve higher order thinking and performing. The term *world class* is often used as an adjective to emphasize the competitive context within which these standards are demonstrated.

The authors of the *National Education Goals Report* (1993) identify two types or dimensions of standards–content and performance. Content standards describe the areas of knowledge all students should have access to if they are to meet the challenges of productive citizenship. Performance standards describe the skill competencies students should achieve. This dichotomy is especially clear for teacher education standards. Content is directly related to subject matter expertise and performance standards are directly related to pedagogical skill.

The national standards movement in education is guided by the following three principles: (1) The use of standards is entirely voluntary, (2) the standards are not fixed forever, and (3) the development process is truly inclusive (*National Education Goals Report*, 1993). These principles are structured to minimize the negative reaction or threat of the standards efforts and to ensure a dynamic and objective process for formulating the standards.

Standards for Teacher Education

In response to the central recommendation of the Carnegie Corporation of New York's Task Force on Teaching as a Profession (Carnegie Forum on Education and the Economy, 1986), a national board for professional teaching standards was developed. In October 1987, the National Board for Professional Teaching Standards (NBPTS) began developing standards for the teaching profession to improve the quality of education in the United States. Through these standards, the NBPTS hopes to improve education by creating

National Board Certification for teachers. Meant for experienced rather than beginning teachers, the NBPTS expects teachers to take the "boards" voluntarily to verify their expertise ("Carnegie Board," 1987). National Board Certification is meant to complement, not replace, state systems of licensure for beginning teachers (National Board for Professional Teaching Standards [NBPTS], 1989). State licensure programs will be viewed as the minimum standards required for competent teaching; National Board Certification will provide assurances of high quality professional practice.

The establishment of National Boards for teaching certification will have considerable impact on the teaching profession (NBPTS, 1989; "South Central," 1989). These impacts include (a) influencing the rigor and coherence of preservice and inservice teacher education programs; (b) reshaping the public's perception and appreciation of teaching as a profession; (c) incorporating professional values through National Board Certification that will be promulgated as teachers prepare for the assessments; (d) enhanced self-esteem, working conditions, and compensation for teachers; (e) increased responsibility for leadership and supervision for board certified teachers; and (f) increased self-governance within the profession as more teachers become board certified.

While the policies and procedures of the NBPTS are controversial in many ways, the approach they are taking toward teacher assessment is noteworthy. NBPTS hopes the National Boards will convey an image of teaching as a complex activity that is more than mastery of content. Teaching includes mastery of classroom organization, management of students, and the "capacity to transform what you know into examples and illustrations and exercises that will instruct and inspire students" ("Carnegie Board," 1987, p. 23). Working through the Teacher Assessment Project at Stanford University, NBPTS is developing multiple methods for assessing professional teacher competencies. Using more than paper and pencil tests, NBPTS hopes to develop instruments, observations, and documentation that will provide the rich and abundant evidence needed to assess teaching competency. The resultant assessments will include essay and multiple-choice tests, simulations that pose educational dilemmas, exercises, interviews, observations of performance in schools, and evidence of competency accumulated over time as documented in portfolios. It is expected that the National Boards will not be administered in a "one-shot" examination

period; rather, candidates will be exposed to several days of practical exercises related to teaching competency such as critiques of textbooks, collaborative curriculum design activities, and analysis of filmed teaching episodes.

A parallel development to the formulation of teaching standards (and probably basic to it) has been the formulation of standards for educational programs within the disciplines. Resnick and Nolan (1995) provide an interesting reflection on the standards development process. They initially thought there would be difficulty in getting people to agree about details, but they believed that assembling groups of stakeholders within the various areas of the curriculum and having them reach consensus on the standards was a reasonable process. They cite the example of the standards developed by the National Council of Teachers of Mathematics (NCTM). Resnick and Nolan saw these standards being officially and unofficially adopted by states, districts, and even textbook publishers. Even the National Assessment of Educational Progress attempted to adapt their own work to the new standards.

Resnick and Nolan (1995) explain that the process has not gone smoothly. The results have raised questions among experts in English, history, science, and geography. These questions are fundamentally basic and include: What are standards, do we need them, and do we want them? The Goals 2000 legislation has created a national education standards council that will review the standards submitted by the various disciplinary groups. However, this council lacks true clout in sanctioning and enforcing standards. It is possible that the fear of a national curriculum has shown its face.

The experiences with the development of curriculum standards will most likely parallel the efforts to formulate teaching standards. Within vocational education, the Vocational Education Standards Committee has been working, under the auspices of the NBPTS, to formulate teaching standards. This committee has experienced what most other curricular areas have experienced: difficulty in boiling down the complex tasks of teaching and sorting out the differences and similarities that exist within the specialty areas of vocational education. Simultaneously, subgroups within vocational education, usually associated with one or more segments of their respective professional associations (e.g., AVA, NAITTE, NAIT), have undertaken the task of formulating content area specific teaching standards. These are all at varying stages of development.

Teaching Standards and Their Meaning for Assessment

Assessment in vocational teacher education will more than likely reflect the tradition of duality. That is, there will be assessments of teaching standards and assessments of standards that reflect subject matter expertise. Because vocational teachers have a more varied origin than teachers in most other disciplines (i.e., not all matriculating from a four year program), the field has had more varied assessment practices than math, science, English, and others.

Duenk (1989) has identified eight different types of assessments used in making licensure decisions in the United States. These include trade licensure examinations by the states, occupational competency tests such as those administered by the National Occupational Competency Testing Institute (NOCTI), and other methods that focus on occupational expertise.

Assessment related to pedagogical skills have been of limited use. Exceptions exist with the teacher performance tests in California and other approaches that have been tried in the past. With new and improved standards for teachers in vocational education, new and improved assessment methods must follow. The belief that possessing occupational competence ensures an ability to teach is unfounded. Merely passing courses in teacher education programs is on equally shaky ground. The following section highlights some trends and provides direction for innovation in assessment.

CONTEMPORARY APPROACHES IN TEACHER EDUCATION ASSESSMENT

There are several emerging trends in assessment impacting vocational teacher education programs. These trends include a change from a testing culture to an assessment culture, an increasing use of multiple assessment tactics including teaching portfolios, and the establishment of centers to facilitate the process of teacher assessment.

Adopting an Assessment Culture

In a recent review of educational research in assessment, D. Wolf, Bixby, Glenn, and Gardner (1991) argue for a change from a

testing culture to an assessment culture. Wolf and colleagues contend that the emphasis on testing has created a culture that views learning and assessment in ways that are unproductive for maintaining quality learning and instruction. To make the change from a testing culture to an assessment culture, Wolf et al. advocate adoption of the following principles:

1. Educators need to view assessment as an occasion for learning rather than testing. With a proper approach to assessment it is believed that not only can the need to assess the outcomes of learning be met, but the opportunity to improve learning and instruction will also be created.
2. The testing culture views assessment as a "point in time" evaluation of knowledge while an assessment culture views assessment as formative and ongoing. As this principle gains acceptance and becomes implemented, the need for final exams may disappear (Frederiksen, 1990).
3. The testing culture emphasizes a norm-referenced approach to evaluation that determines student ranks within a norm group. In an assessment culture, the adoption of a criterion-referenced philosophy of evaluation leads to assessment focused on accomplishment rather than rank.
4. The testing culture views learning as the accumulation of knowledge that is verified through recognition and recall tests taken individually in schools. In contrast, an assessment culture views learning as a constructive process that is verified by application, use, and transfer of knowledge in real contexts with external support. Tests in an assessment culture should emphasize learning and thinking, require generation as well as selection, and be an ongoing occurrence during learning rather than serving as exit points for instruction (Collins, 1990).
5. In the testing culture, correctness is desired, simple and low levels of understanding are usually evaluated, and test design is based on ease of scoring. In an assessment culture, the process of performance is valued beyond simple correctness; there are exhibitions of invention, transfer, and inquiry; and the content of assessment is based on what we want students to know and do rather than what is easy to score.

Utilizing Multiple Performance Assessments

As educators begin the transition from a testing culture to an assessment culture, methods of assessment will change drastically. Rather than relying on multiple-choice and essay tests as exit assessments of student learning in courses and as credentialing examinations for teacher certification, assessment in vocational teacher education needs to condone on-going assessment through multiple performance assessment tactics. Because many of the problems encountered in professional practice are structured in ways that cannot be quantified on paper and pencil tests, assessment must focus on the direct assessment of practical skills. This includes traditional assessment techniques such as interviews and classroom observations as well as innovative approaches such as situational tests, portfolio reviews, and performance exams ("Northeast Conference," 1990). In addition, increased attention should be given to assessing professional and personal qualities such as honesty, judgment, work habits, maturity, psychological stability, and adaptive capabilities (McGaghie, 1991).

Performance assessment is more concerned with a student's performance in constructing or developing some product rather than choosing a correct answer (Farr & Tone, 1994). Typically, an instructor will assign a task to a student and either observe the process used by the student while completing the task and/or examine the product that results. The use of multiple performance assessments in teacher education provides the instructor with first hand information regarding the student's level of competency with the tasks that teachers perform in day to day instructional settings.

An example of an assessment system for teacher education that relies on multiple performance assessments is being developed by the Far West Laboratory for Educational Research and Development as part of the California Career-Vocational Education Student Certification Project. This evaluation system divides certification assessment into two major categories: cumulative assessments that occur throughout the teacher education program and administered assessments that occur upon completion of the program. The cumulative assessments include the evaluations completed during supervised practical experiences, a certification project that involves planning and constructing a product or writing about a specific event in the field, and a comprehensive teaching portfolio. The administered

assessments include a multiple choice test covering basic skills and field-specific information, a written task dealing with a complex and realistic problem solving scenario, and performance tasks that may be manipulative activities, role plays, or oral presentations. Clearly, professional competence involves much more than can be assessed through traditional achievement testing.

Although performance assessment is a powerful method of assessing competency, there are several inherent weaknesses that must be addressed. For example, the reform of assessment practices in the United Kingdom resulted in the creation of a new government agency, the National Council for Vocational Qualifications, that required that qualification assessments be criterion-referenced and performance-based (A. Wolf, 1995). The result was that curriculum and assessment requirements were redesigned so that students had to demonstrate their achievement of large numbers of core competencies. All assessment therefore focused on "competent performance" that included the ability to apply and use the desired skills and knowledge in "authentic" situations.

Following the implementation of this reform toward performance assessment, several major concerns surfaced (A. Wolf, 1995). First, there was a huge increase in the volume of assessment activity in the classrooms. Each unit in the course included a long list of competencies that must be demonstrated by the student and assessed by the instructor. This resulted in little teaching occurring in the classroom due to the volume of assessment that needed to occur. Second, because of the volume of assessment activity required of the instructor, formative assessment tended to disappear. Either the student demonstrates the desired level of competency or they are told that they require further practice and re-assessment. However, with so much time being devoted to the assessment of performance, the teachers tended to encourage students to be assessed only when they can successfully demonstrate the desired level of competency. Third, several studies reported by A. Wolf (1995) found wide variation regarding the level of performance demonstrated by individual students even though the assessment criteria were highly prescriptive. Their results raise questions about the use of standards as criteria for performance assessments. It was observed that the assessors in the Wolf studies tended to ignore the written standards in favor of their own standards and judgments.

The Teaching Portfolio

While multiple methods of assessment are needed to evaluate the teaching capabilities of preservice vocational teachers, the teaching portfolio may be the most authentic and useful approach available. What is a teaching portfolio? Using an analogy that borrows from the practice of architects, artists, and photographers, a teaching portfolio is a display of one's best work related to teaching (K. Wolf, 1991). As such, a teaching portfolio is not a comprehensive record of teaching performance over time; rather, it is a selective sampling of the best work that illustrates one's personal distinctive teaching style (Edgerton, Hutchings, & Quinlan, 1991). Essentially, teaching portfolios are a collection of work samples that are supported by reflective critiques.

The content of a teaching portfolio can vary depending on the expectations of the instructor and the purpose of the portfolio (Barton & Collins, 1993; Farr & Tone, 1994). One example of a teaching portfolio includes two main sections, (1) introductory information and (2) work samples. The introductory section can contain a professional biography of the person who is preparing the portfolio (Edgerton et al., 1991). While this section could resemble a typical resume, it should also include a reflective description of the key stages that occurred during his or her development as a teacher. The main body of a teaching portfolio contains actual work samples generated by the individual and can be organized around the four core tasks that confront every teacher:

- course planning and preparation,
- actual teaching,
- evaluating student learning and providing feedback, and
- professional development (Edgerton et al., 1991).

Course planning. This section of the portfolio includes a collection of course syllabi, lesson plans, learning activities, and student assignments. Each of these entries in the portfolio should be followed with a reflective commentary regarding the critical decisions made during planning, the changes that occurred in these materials over time, and the effectiveness of the overall planning process.

Actual teaching. The goal of this section is to document, as clearly as possible, one's degree of competency as an instructor. The possibilities for this section are quite varied. Reflective journals provide a daily recording of one's thoughts and reactions to the

teaching process. When kept over an extended time period, these journals capture changes in teaching philosophies, document teaching strengths and weaknesses, and illuminate developmental progress as a teacher. Notes provided by peers, cooperating teachers, and university supervisors can be used to prepare the reflective essays of one's growth as a teacher. Students' reflective responses to formal evaluations of their own teaching provides for introspective self-evaluation. References can also be made to specific segments of an accompanying videotape that reveals one's distinctive style as a teacher. Each of these samples of teaching should be supported by a reflective essay that highlights the importance of each portfolio entry.

Evaluation and feedback. This section contains samples of tests, quizzes, and other evaluation instruments. Of particular interest are samples of actual tests and assignments that illustrate the type and quality of feedback provided to students. A reflective narrative that critiques one's capability as an evaluator and communicator should accompany each entry in this section.

Professional development. This section gives teachers an opportunity to describe how they maintain and upgrade their professional skills and how they contribute to the field. Appropriate entries in this section include documentation of professional development activities such as school visitations, volunteer work, and participation in workshops, seminars, and professional meetings. Reflective essays that describe how these activities enhance one's knowledge or skills as a teacher should be included.

Assessment Centers

Assessment centers have a reported beginning in the military during World War Two. The Office of Strategic Service used the method to assess potential candidates for important positions. Essentially, assessment centers include a variety of testing techniques designed to allow candidates to demonstrate, under standardized conditions, the skills and abilities that are most essential for success in a given job (Joiner, 1984). In contemporary use, assessment centers have been most visible for the assessment of potential managers who are being considered for promotion. Law enforcement and other public service organizations have also used the assessment center model to effectively select people for employment or advancement.

The concept of the assessment center evolves from a separate location or "center" where people are sent to be tested, often by an external organization that specializes in assessment. The assessment processes used in centers are multidimensional and almost always involve work simulation as well as more traditional paper and pencil testing. The belief is that such a comprehensive portrait of a candidate's skills and aptitudes, viewed by an unbiased party, will provide a valuable perspective to the assessment process.

The assessment center concept has also been adapted for use in the selection of school administrators, applicants for graduate study in universities, and in teacher assessment. It is believed that an assessment center, or at least the concept, has potential utility in the assessment of new and experienced teachers. The traditional view of assessment centers has been one of summative assessment. However, the same procedures can be altered to provide formative feedback for teachers.

EMBRACING NEW FORMS OF ASSESSMENT IN VOCATIONAL TEACHER EDUCATION

Assessment in many vocational education classrooms at the secondary level closely resembles authentic assessment. Vocational teachers give assignments to students that are imprecise, problem centered, and highly experiential. Students complete these assignments using considerable problem solving and other intellectual processes as well as hands-on practice with tools, materials, and equipment. During these activities, vocational teachers observe students in action, provide mentoring and coaching support, and continually assess student performance. Much of the subjective, naturalistic assessment that occurs through observations and interactions with students in lab settings provides vocational teachers with a greater understanding of student learning that can be used to improve instruction and to assign grades.

While current practice in vocational education at the secondary level is ideal for integrating authentic assessment into instruction, similar practice is rarely found in teacher education. Teacher education is bound by the traditions and practices of the norm-referenced testing mentality. As such, teacher educators typically display a "Do as I say, not as I do" attitude. While teacher educators often preach about the importance of variety in teaching methods,

developing quality lesson plans, and using performance assessment, their actual performance in class is much different. Teacher educators are commonly viewed as omniscient authorities, lectures and discussions dominate their instruction, individual effort and performance is valued and encouraged, final examinations are given more value than daily performance, and assessment consists of pencil and paper evaluations. This type of instructional practice hardly serves as the model of teaching and assessment we would like future teachers to emulate.

Education professors, supervising teachers, and classroom instructors realize that new teachers typically teach as they were taught. If a student teacher is mentored by an instructor who relies on lectures, worksheets, and weekly quizzes, it is likely that the student teacher will adopt similar teaching practices. The same thinking can be applied to this discussion of assessment. Because we teach as we were taught it can be assumed that we also assess as we were assessed. Clearly, assessment in vocational teacher education should support the kind of practice expected in vocational education programs in elementary and secondary schools. Vocational teacher educators need to establish clear expectations about what future teachers need to know and do relative to assessment. Teacher educators then need to rediscover the methods of authentic assessment and explicitly model the desired practices in their own teaching. As authentic assessment methods become a major focus of the instructional content and practice in professional courses, vocational teacher education students will have the opportunity to observe and experience the benefits of realistic assessment and, ultimately, use similar strategies for assessment in their own teaching in the future.

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8

Epilogue

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The writers of this monograph agree that substantive change in vocational education and the preparation of its teachers is both necessary and inevitable. Furthermore, they note that such change cannot be simple, involving merely different responses to different events. It must be systemic, profound change–a difference in the way the preparation for the world of work is conceptually organized. If vocational education and its teacher educators do not fully embrace such fundamental changes, the field of vocational and technical education may not survive in any form.

In Chapter 5 Copa and Plihal suggest that change, from whatever direction, will require students to balance competing demands and to succeed in work environments no longer as closely delineated as in the past, no longer circumscribed along linear, well-structured lines. Their new work world will be characterized by overlapping and recursive responsibilities, by mobility and flux rather than stability and predictability. The authors note how prevalent this shift has become across all demographic boundaries in our society. Not only are jobs less strictly defined, but families and communities are as well. In all these areas of adult life, fewer and fewer assumptions and expectations about stability and predictability in work and family can be taken for granted. Copa and Plihal recognize that what students will need most, therefore, is academic and vocational curriculum and instruction that promote flexibility and adaptability to changing situations. They have provided a road map aimed at providing students with the abilities necessary for work in environments characterized by change.

Vocational education's specific practices must be guided first by general principles, as Lynch and Miller point out in Chapters 1 and 3. This sound conceptual core includes a common base of knowledge, shared epistemology, and a well-defined and universally practiced professionalism. These in turn will express themselves, as Lynch

notes, in a commitment by vocational education professionals to lifelong learning and accountability to both students and society.

Essential in a coherent response to change, according to Miller, is a shared, consistent philosophy. Miller demonstrates the necessity for coherence and concurrence on the concepts of value, truth, and reality–crucial characteristics if vocational education's promise of preparing all students to undertake the roles and responsibilities of vocational life is to be realized.

From these general themes and a shared philosophy based on established practice, proceed the more specific principles underpinning vocational teacher education. Lynch recommends ten such principles for faculty and programs, drawn from these general themes and aimed at ensuring that students who emerge from vocational teacher education programs have a common knowledge of workplace education, a thorough general education, an understanding of the principles of educational practice, and significant clinical experience. Lynch explains that adherence to such principles also commits vocational education programs to cultural diversity and an integrated, articulated curriculum in which academic and vocational domains are merged. In such programs, faculty assigned to vocational education would employ dynamic pedagogy, be adequately supported by time and resources, and be dedicated to a multi-faceted workplace-centered curriculum–a "broad field" knowledge base as Copa and Plihal described it earlier.

Even more specifically, Copa and Plihal assert, these principles urge vocational teacher educators to impart the sorts of skills to their students that will allow them to deal with resources, interpersonal relations, information, systems, and technology. In fact Copa and Plihal argue that vocational education can become an umbrella curriculum, unifying vocational concerns with the larger roles and responsibilities inherent in work, family, and community.

Toward that end, in Chapter 6 Biggs, Hinton, and Duncan recommend a constructivist approach to the redesign of vocational teacher education. Because constructivism provides an organizing schema for integrating pedagogy and content, it supports the acquisition of precisely those skills needed by preservice students to teach in new and more meaningful ways. Many of the practices suggested by Biggs, Hinton, and Duncan will be familiar to vocational educators as part of cognitive theory. Peer tutoring, critical thinking, apprenticeship, and knowledge applied to real-life situations have

long been methods used in vocational education teachers' repertoires. The same pedagogical features–namely, modeling, coaching, scaffolding, situated learning, guided discovery, implicit feedback, learning from mistakes, and self-monitoring–that have made vocational education a success over the years are likely to prove effective with integrated, nondifferentiated academic and vocational curricula.

Such specific recommendations reflect the general principles Lynch suggests and reinforce the philosophic coherence advocated by Miller. Also consistent with these aims, write Biggs, Hinton, and Duncan in their chapter, are the new approaches of the school-to-work movement such as career clusters, single occupation high schools, magnet schools, and shifts in curricular focus that include education for all students. Biggs, Hinton, and Duncan also elaborate upon the idea of cognitive apprenticeship, a practice with which vocational-technical educators have long been familiar.

There is consistency and alignment between the specific practices suggested by Biggs, Hinton, and Duncan and the broader principles encouraged by the authors of earlier chapters. The curricular and pedagogical concepts suggested by Copa and Plihal and the philosophical and programmatic coherence and consistency promoted by Lynch and Miller, for example, point directly to Biggs, Hinton, and Duncan's recommendations for continuous professional development for vocational education teachers and teacher educators, for increased school-employer communication and full-year clinical experiences, and finally for implementation of integrated vocational and academic curricula.

These initiatives support the notion that the school should more accurately reflect the workplace, something upon which the authors of this monograph universally agree, both theoretically and practically. Moreover, such initiatives reinforce their generally shared principles that career development, lifelong learning, contextual learning, professionalism, workplace practices, common knowledge base, and interrelated curricula are vital to vocational education's success and survival.

As Biggs, Hinton, and Duncan note, these directions, if pursued, will require faculty who are flexible and open to change, well-versed in current theory and practice, technologically literate, and fully acquainted with a variety of pedagogical and andragogical methods. Achieving this goal, Johnson and Wentling point out in Chapter 7,

suggests in part a system of assessment that is ongoing and related directly to what is taught in the classroom and corresponding work-based learning sites. Teachers and teacher educators, Johnson and Wentling argue, should adopt an "assessment culture" to replace the older evaluative culture. They should embrace a formative rather than summative focus and encourage a shift from reliance on norm-referenced, standardized measures to criterion-referenced, authentic ones.

Echoing the themes sounded by earlier authors, Johnson and Wentling counsel vocational education to concentrate on the transfer and use of knowledge and on knowledge gained through application, to avoid developing (in both students and teachers) assumptions that contradict the philosophical principles laid out by Lynch and Miller. These ill-conceived assumptions include the notions that there is a single right answer, that problems are generally well-structured, that guessing is inappropriate, and that right answers reside solely in the teacher. Such assumptions, claim Johnson and Wentling, make curricula test-driven and fragmented, greatly lessening the chances of developing the kind of cross-content, transferable skills and abilities urged by Copa and Plihal, Biggs, Hinton, and Duncan, and others.

Establishing a context for these kinds of reforms will not be easy, write Hartley, Mantle-Bromley, and Cobb. Reform-minded reports focusing on the state of education in the last decade have concentrated on what is wrong with education, schooling, and teacher education with little regard for looking at the problems facing education today. More specific vocational education reform studies, such as SCANS, Workforce 2000, and *The Forgotten Half*, have echoed the same themes heard here: vocational education should emphasize broad-based problem-solving skills, workplace competencies, business-education partnerships, partner schools, and continuous professional development.

Revitalizing vocational education, write Hartley, Mantle-Bromley, and Cobb, may well require approaches that shake the traditional foundations of the field–integration of vocational and academic curricula, uniform licensure practices for all teachers, effective recruitment of diverse students into teacher education, the establishment of common criteria for teacher preparation as a professional endeavor, and a focus on minimum standards for the profession. Whatever form the reforms take, the obligations of

vocational teacher education programs seem clear. Systemic reform in the context of overall education reform–including, perhaps, a redefinition of the very term *vocational*–will be necessary if we are to hope for an integrated, coherent response to change. Then, conclude Hartley, Mantle-Bromley, and Cobb, we can have confidence in reaching the shared goal of a comprehensive, egalitarian vocational curriculum that blends technical skills, broad based basic skills including problem solving, higher order thinking, learning to learn, and teamwork with academic preparation of students.

What will be the driving force to propel this systemic reform through the end of this decade and into the 21st century? Sustained reform will take energy and stamina, and sustaining reform system-wide will take lots of it. The historical record of planned, proactive reform in education is not replete with examples to provide a road map to guide the kinds of deep and foundation-driven changes suggested by the authors of this monograph. In fact, it is more likely that no single impetus will carry these reforms forward. We suggest, on the contrary, that the force necessary to maintain the velocity of reform must derive from a variety of sources, including the professional commitment of a handful of visionaries from both within and outside the field of vocational education, the power of the standards movement in general education, the promise of the School-to-Work Opportunities Act, and the benefits gleaned from simultaneous renewal of schooling and higher education. It is certainly clear that we are not likely to have better schools without a good supply of well educated teachers. Nor are we likely to have excellent teachers without exemplary schools.